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Literature references in [ ] refer to the *Review of Applied Mycology*.
Map references are to the C.M.I. distribution maps of plant diseases.

BROWN (J. C.), HOLMES (R. S.), & SPECHT (A. W.). **Iron, the limiting element in a chlorosis: Part II. Copper-phosphorus induced chlorosis dependent upon plant species and varieties.**—*Plant Physiol.*, 30, 5, pp. 457–462, 6 graphs, 1955. [Received 1956.]

The effect of varying rates of copper and phosphorus upon the absorption and translocation of iron and the incidence of chlorosis in wheat, maize, and rice were studied in the greenhouse at Beltsville, Maryland, and on peach trees in the field [cf. 33, pp. 479, 496; 34, p. 814]. Comparative studies of the iron concentration required to prevent chlorosis in soy-bean plants susceptible and non-susceptible to this disorder were also made.

Copper and phosphorus were higher and iron lower in chlorotic than in non-chlorotic leaves. Increasing additions of phosphorus did not affect absorption or utilization of iron unless copper was also present. Copper and phosphorus produced chlorosis more effectively when applied together than separately. Phosphorus concentration was higher in the sap of chlorotic than of non-chlorotic soy-beans, but in the residue there was no appreciable difference. Plants susceptible to chlorosis required a higher concentration of both inorganic and chelated iron to prevent iron deficiency.

Iron chlorosis is apparently caused by several factors depending on the physiology of the plant concerned, a specific metabolic system possibly requiring copper in the case of wheat and iron in chlorosis-susceptible soy-beans. Copper and phosphorus together decreased iron absorption and utilization in susceptible soy-beans, but had no such effect on Hawkeye (non-susceptible) soy-beans or Thatcher spring wheat.

SPOERL (E.), SARACHEK (A.), & SMITH (S. B.). **The effect of amino acids upon cell division in Ustilago.**—*Amer. J. Bot.*, 44, 3, pp. 252–258, 3 figs., 1957.

At the Army Medical Research Laboratory, Fort Knox, Kentucky, a strain of *Ustilago sphaerogena* was grown in a liquid basal medium supplemented with ribonucleic acid and a variety of amino acids at equivalent nitrogen concentrations (E. A. Spoerl *et al.*, *Rep. Army med. Res. Lab.* 243, 1956).

It was found that with arginine, asparagine, proline, and ammonium acetate the fungus produced short, rod-shaped, separate cells, whereas with ribonucleic acid, glycine, serine, and threonine the cells were long, tangled, and mycelial. Glutamic and aspartic acids induced a mixture of both forms with intermediates. The first-mentioned group and also methionine, norleucine, and caproic acid were able to reverse the effects of the second and third groups. Low pH favoured cell clumping and high pH the single-cell condition. It appears that the ammonium ion and the

amino group are closely involved in cell division, some amino acids apparently acting to promote divisions, others retarding or being unable to stimulate them.

Spoerl (E.), Sarachek (A.), & Puckett (Norma). **Effects of zinc and amino acid on cell division in Ustilago.**—*Science*, 125, 3248, p. 601, 1957.

At the United States Medical Research Laboratory, Fort Knox, Kentucky, long, clumped cells were produced by *Ustilago sphaerogena* [see preceding abstract] in culture when zinc (0·2 to 5 p.p.m.) was added to the basic liquid medium. The cellular reactions involved in the form changes appeared to be specifically related to processes of division.

Sproston (T.) & Pease (D. C.). **Thermoperiods and production of apothecial initials in the fungus Sclerotinia trifoliorum.**—*Science*, 125, 3248, pp. 599–600, 1957.

At the Department of Botany, University of Vermont, Burlington, tests demonstrated that diurnal thermoperiods influence the production of apothecial initials by *Sclerotinia trifoliorum* in culture on ground whole wheat agar [cf. 29, p. 45]. The optimum was eight hours at 21° C., followed by 16 at 15°, initials being produced in 40 days, though seven months is required in nature.

Bedi (K. S.). **A simple method for producing apothecia of Sclerotinia sclerotiorum (Lib.) De Bary.**—*Indian Phytopath.*, 9, 1, pp. 39–43, 1 fig., 1956.

At the Government Agricultural College and Research Institute, Ludhiana, Punjab, India, apothecia of *Sclerotinia sclerotiorum* isolated from gram (*Cicer arietinum*) were produced by floating sclerotia in water in a covered dish or loosely plugged vessel at a temperature of 15° to 20° C. in a good light [cf. 20, p. 76].

Yamaguchi (M.), Segelman (G.), & Lippert (L. F.). **Potato hair sprout disorder of Potatoes causes problems for processors and seed producers.**—*Amer. Potato J.*, 33, 12, p. 362, 1956.

The information contained in this paper on hair sprout of potatoes in California [26, p. 119] has been noticed from another source [36, p. 422].

Gigante (R.). **La prove dello iodio nella identificazione dei tuberi di Patata virosati.** [The iodine test in the identification of virus-affected Potato tubers.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, 14 (*1956*), 1, pp. 147–151, 3 figs., 1957. [English summary.]

In work at the Centre of Potato Studies, Bologna, and the Plant Pathology Station, Rome, Hirata's modification of the iodine method for detecting the presence of virus disease in potato plants [30, p. 185] gave better results with newly dug tubers than with those which had already germinated. The results, however, were not invariably satisfactory, and it is apparent that the method is still open to improvement, though it successfully demonstrated the presence of leaf roll virus in Majestic and Sieglinde tubers and rugose mosaic virus in Allerfrüheste tubers.

Marini (Enrica). **Diagnosi sierologiche con la reazione di agglutinazione dei cloroplasti.** [Serological diagnoses by the agglutination reactions of the chloroplasts.]—*Ital. agric.*, 93, 9, pp. 695–697, 4 figs., 1956.

An account is given of the application of the expeditious serological method of virus investigation developed in the Netherlands [31, p. 218] to the diagnosis of potato virus X on potatoes in Italy, where it is now used as a routine laboratory procedure.

Hansen (A. J.) & Larson (R. H.). **The occurrence of the brownspot strain of Potato virus X.**—*Amer. Potato J.*, 34, 1, pp. 6–9, 3 figs., 1957.

At the University of Wisconsin, Madison, in 1956, the brownspot (necrotic spot, local lesion) strain of potato virus X [35, p. 481] was isolated by one or more single lesion transfers through *Nicotiana rustica* [29, p. 377] from nine American, five British, and two German out of a total of 51 potato varieties tested.

Boser (H.). **Einfluss pflanzlicher Virosen auf Stoffwechselfunktionen des Wirtes. I. Mitteilung. Glykolyse und Atmung gesunder und roll-, strichel- und mosaikkranker Kartoffeln.** [The influence of plant viruses on the metabolic processes of the host. Part I. Glycolysis and respiration of healthy and roll-, streak-, and mosaic-diseased Potatoes.]—*Biochem. Z.* 328, pp. 458–464, 2 graphs, 1957.

Studies at the Institute for Biochemistry, Hann.-Münden, on the influence of viruses on metabolism showed that anaerobically stored potatoes were suitable subjects for this purpose. [Leaf] roll, streak [potato virus Y], and mosaic viruses affected carbohydrate metabolism varyingly. Respiration and the conversion rate of sugar and citrate were heightened in tubers affected by potato virus Y, while in mosaic- and leaf roll-affected tubers the contrary was the case. Large quantities of lactic acid were formed in anaerobic storage by mosaic- and potato virus Y-affected tubers, but only small amounts in those affected by leaf roll. No accumulation of phosphorylized intermediary products of glycolysis was observed after aerobic or anaerobic storage. In leaf roll-diseased tubers there was a reduction of phosphoglucomutase activity.

Sommereyns (G.). **Contribution à l'étude de la transmission par jus du virus Y de la Pomme de terre.** [A contribution to the study of the sap transmission of Potato virus Y.]—*Parasitica*, 13, 1, pp. 18–30, 2 figs., 1957.

In a study at the Laboratory of Phytovirology, Gembloux, Belgium, of the effect of certain environmental factors on the inoculation by sap transmission of potato plants with potato virus Y, Bintje potato plants were grown during March and April in ordinary greenhouse conditions and in November and February in underground chambers in controlled conditions of lighting, temperature, and humidity. When the plants were about 10 cm. high and had two leaves on the stem and four at the apical bud, these last four were inoculated by rubbing with sap from an infected tobacco plant. After inoculation, the plants were returned to the greenhouse or the underground chambers, the latter being lit by fluorescent tubes and maintained thenceforth at 20° C.

Exposure of the plants to complete darkness for the 48 hours immediately preceding inoculation appreciably increased the percentage of infection that resulted in winter, but had no effect in spring, either in ordinary glasshouse conditions or on plants grown (in the greenhouse and in the special chambers) under fluorescent lighting.

Placing the plants in the winter of 1954 at 15° and 20° after inoculation, and in the winter of 1955 at 14°, 20°, and 25° during inoculation made no difference to the percentage of infection that resulted. Plants placed, however, either in winter or in spring, in the special chambers and kept at 20° after inoculation, developed distinct symptoms of infection after 12 days, whereas similarly inoculated plants placed in ordinary greenhouse conditions and exposed to daily fluctuations of light and temperature required 20 days to develop less distinct symptoms.

A strain of the virus from Bintje potatoes appeared to be the most virulent of the four strains tested. Throughout the work, all inoculations made in spring on plants which had reached the stage of growth described above were successful. When leaves at the base, in the middle, and at the apex of the stems of three lots of plants 30 cm. high were inoculated in April, one month later all the plants developed

generalized symptoms of infection. The addition to the infected sap of chemical adjuvants at the time of inoculation did not increase the percentage infection in winter.

It is concluded that the sap transmission to potato plants of potato virus Y may be carried out successfully in winter if a virulent strain of the virus is used on plants grown under fluorescent lighting and kept in complete darkness for 48 hours preceding inoculation. In spring, positive results may be obtained on potato plants grown in ordinary greenhouse conditions, without previous exposure to total darkness, and with either a virulent or a moderately virulent strain of the virus.

WENZL (H.). **Vom Krankheitsbild der Blattrollkrankheit der Kartoffel.** [On the symptomatology of the leaf roll disease of Potato.]—*Pflanzenarzt*, 10, 1, pp. 2–4, 4 figs., 1957.

The symptoms of leaf roll virus on different potato varieties in Austria [35, p. 629] are described in detail. Bintje is seldom affected, while Virginia is highly susceptible.

ARENZ (B.) & ELKAR (G.). **Auftreten und Ausbreitung der Bukettkrankheit der Kartoffel in Bayern.** [Occurrence and extent of spread of bouquet disease of Potato in Bavaria.]—*Jb. bayer. Landw.*, 33, 4, pp. 387–406, 4 figs., 1 graph, 1 map, 1956.

During the standard 'eye-cutting' testing [36, p. 419] at the Landessaatzuchtanstalt, Weihenstephan, of potato tubers from stands destined for 'seed' production, record was made of bouquet disease infection [tobacco ring spot virus: 35, p. 481] over the period 1950–54, and subsequent field checks allowed the incidence in Bavaria to be determined.

The disease has spread from year to year and there are regions of heavy, moderate, and scattered infection. All the soils in affected areas had low pH, and many were in hilly country with relatively heavy rainfall, marshy conditions, and late growth of vegetation. All the varieties widely grown in Bavaria were affected, the incidence varying from one to another.

Purple-top wilt of Potatoes.—*Agric. Gaz. N.S.W.*, 67, 12, pp. 646–649, 4 figs., 1956.

Much of the information contained in this paper on purple-top wilt of potatoes, caused by tomato big bud virus, in New South Wales has already been noticed [35, p. 546]. Losses have been most severe in the Windsor section of the Sydney metropolitan area and west of the Dividing Range. No commercial variety has proved resistant. Destruction of weeds and application of 2 per cent. D.D.T. dust to the crop at 10-day intervals as soon as vectors (*Orosius argentatus*) are observed is recommended for control.

GIGANTE (R.). **Osservazioni sulla rizoctoniosi dei tuberi di Patata.** [Observations on rhizoctoniosis of Potato tubers.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, 14 (*1956*), 1, pp. 73–88, 9 figs., 1957. [English summary.]

After stating that in some parts of Italy infection of potatoes by *Corticium solani* [13, p. 598; 17, p. 133] has recently assumed alarming proportions, the author gives a full account of the symptoms of the disease (locally), the influence of environmental factors upon it, and its control. Preliminary experiments on control by immersion of the seed-pieces for 15 minutes in a 0·1 per cent. solution of quinosol gave promising results.

THURSTON (H. D.). **The culture of Phytophthora infestans.**—*Phytopathology*, 47, 3, p. 186, 1957.

This note from the University of Minnesota, St. Paul, details a method of growing

and maintaining *Phytophthora infestans* on Lima bean agar with added dextrose and difco yeast extract, subculturing once a month, and storing at 3° to 5° C. or under mineral oil. For obtaining large amounts of inoculum of *P. infestans* 10- to 14-day cultures on sterilized yellow peas soaked in water were the most effective, six 250-ml. flasks providing enough inoculum for 2,400 ft. of potato plant rows.

EDDINS (A. H.). **Control of late blight of Potatoes with fungicides at Hastings, Florida.**—*Amer. Potato J.*, 34, 2, pp. 42–48, 1957.

The author tabulates and discusses the results of fungicide trials on Sebago potatoes for the control of late blight (*Phytophthora infestans*) held at the Potato Investigation Laboratory, Hastings, Florida, from 1949 to 1954.

In 1949, when all non-treated plants died 79 days from planting, dithane D 14-zinc sulphate and parzate liquid-zinc sulphate sprays proved slightly more effective than tribasic copper-zinc spray and much more effective than zineb, tribasic copper-zinc, and copper compound A dusts.

During fairly high incidence of *P. infestans* in 1953, plants sprayed with maneb or copper compound A yielded 30 to 36 sacks per acre more than those sprayed with nabam-zinc sulphate, captan, or ethylene bisthiuram trisulfide.

FOLSOM (D.). **Verticillium wilt of Potato in relation to fungicides added to the fertilizer.**—*Amer. Potato J.*, 34, 1, pp. 1–5, 1 fig., 1957.

At the University of Maine, Orono, eight fungicides were tested as fertilizer admixtures for the control of *Verticillium albo-atrum* on Kennebec potatoes [35, p. 922; 36, p. 348]. In the greenhouse, the wilt percentage in plants growing in artificially infested soil treated with calcium sulfamate and HD-160 was 5 and 0, respectively, as against 12 for the untreated controls. Field results were not promising for any of the preparations tested; only HD-160 reduced wilt but it also caused stunting.

MOOI (J. C.). **Zilverschurft bij Aardappelen.** [Silver scurf of Potatoes.]—Abs. in *Tijdschr. PlZiekt.*, 63, 1, p. 29, 1957.

Spondylocladium atrovirens is stated to be so widespread on potatoes in the Netherlands that scarcely a single consignment of tubers remains free from infection in storage within a temperature range of 3° to 30° C. (optimum 20° to 24°) and 90 to 100 per cent. relative humidity (optimum ±98). Both in 1955 and 1956 early-lifted tubers stored in a clamp contracted heavier infection than late-lifted, although when dug the former were healthier than the latter. Control may be effected by storage under dry conditions, e.g., in basin-trays, and other possibilities are also under investigation.

KOLE (A. P.). **Enkele bijzonderheden over de bouw van de zoösporen uit de zomersporangia van Synchytrium endobioticum.** [Some peculiarities of the structure of the zoospores from the summer sporangia of *Synchytrium endobioticum*.]—Abs. in *Tijdschr. PlZiekt.*, 63, 1, p. 28, 1957.

An electron-microscopic study [at the Agricultural College, Wageningen, the Netherlands], of zoospores extruded by the summer sporangia of *Synchytrium endobioticum* [35, p. 630] revealed a vacuole and a poorly differentiated nuclear mass. The flagellum is cylindrical and of fibrous structure, becoming markedly attenuated towards the end for about one-fifth of its entire length and terminating in a nodular swelling. Some flagella were shown to consist of 11 separate fibres, each apparently composed of two parts.

PADWICK (G. WATTS). **Diseases and pests of Rice in Japan.**—*Outlook on Agric.*, 1, 1, pp. 20–23, 1956.

After a short account of the specialized conditions under which rice is grown in

Japan, where it is intensively cultivated over a wide climatic range and often as the second of two annual crops on the same land, the writer describes briefly the chief diseases of the crop there and the chemical means employed to control them, all of which have been noticed from time to time in this *Review*.

Bakanae disease, caused by *Gibberella fujikuroi* [cf. 18, p. 707] and once of importance in Japan, has now been controlled by use of organomercurials and is a rarity. Brown spot (*Helminthosporium oryzae*) [*Ophiobolus miyabeanus*: 36, p. 495 *et passim*] is also largely controlled by immersing the seed for 12 hours in 0·5 per cent. uspulun. The most important disease is blast (*Piricularia oryzae*) [35, p. 924 *et passim*] for which a warning system for dusting has been introduced. This is generally done twice in a season with 30 to 40 kg. per ha. of an organomercurial containing 0·15 to 0·25 per cent. mercury.

Stem rot caused by *Leptosphaeria salvinii* [36, p. 496] and oriental sheath spot (*Corticium sasakii*) [loc. cit.] have increased in severity in recent years, possibly owing to the greater use of nitrogen fertilizers. A ceresan-lime mixture gives control [36, p. 495].

Rice dwarf [32, p. 506] is the chief virus disease of the crop in Japan. The vectors are controlled by insecticidal dusting.

PUTTARUDRIAH (M.). **Blast disease of Rice, Oryza sativa L. Piricularia oryzae Bri. et Cav. (P. grisea (Cooke) Sacc.).**—*Mysore agric. J.*, 30, 4, pp. 221–251, 1 pl., 1 diag., 1 map, 1954. [Received March, 1957.]

This review of information on the blast disease of rice caused by *Piricularia oryzae* [map 51] has been compiled largely from papers already noticed.

SCHIPSTRA (K.). **Onkruiden als indicatoren voor voedingsziekten.** [Weeds as indicators for nutritional diseases.]—*Tijdschr. PlZiekt.*, 63, 1, pp. 15–18, 1957.

Weeds have been found useful as indicators in the diagnosis of various nutrient deficiencies in agricultural and horticultural crops in the Netherlands. For instance, the white margins of dying rye leaves were recognized to be a consequence of potassium deficiency through the development of comparable symptoms on *Chrysanthemum leucanthemum*, *Ranunculus repens*, and white clover; in peas on river clay soil the disorder was diagnosed from the occurrence of leaf abnormalities in *Chenopodium polyspermum*, *C. album*, *Solanum nigrum*, clover, *Galeopsis speciosa*, *G. tetrahit*, and *Achillea millefolium*.

The leaves of *C. album* and *S. nigrum* when affected by phosphorus deficiency develop dullness and darkening, with necrotic, brown spots at the tips in the latter species and in maize and beet crops with similar symptoms.

The diagnosis of magnesium deficiency in grass seedlings was assisted by the observation of leaf chlorosis and tissue necrosis in *Polygonum nodosum*; in a turnip crop it became apparent at an earlier stage in *Raphanus raphanistrum*, *S. nigrum*, and *Euphorbia peplus*.

C. album growing in a plot of maize with pale yellow leaves showed the same symptoms of manganese deficiency as beet [35, p. 844]. The small, irregular, necrotic spots on stinging nettle leaves in a barley plot were also found to be due to the same deficiency.

Molybdenum deficiency in a rye crop was clearly expressed in *Rorippa silvestris*, which displayed the yellow to whitish leaf discoloration characteristic of beet [loc. cit.].

MUELLER (K. E.) & DURRELL (L. W.). **Sampling tubes for soil fungi.**—*Phytopathology*, 47, 4, p. 243, 2 figs., 1957.

An improvement on Chester's immersion tube for soil sampling [28, p. 240; 36, p. 125] is described from Colorado A & M College, Fort Collins. The perforated glass

test tube is replaced by a plastic one, in which holes ($\frac{3}{16}$ in.) are bored in a spiral and countersunk, the whole being wrapped spirally with koroseal electrical tape. In the field a large hot needle is pushed through tape and hole into the agar. After exposure in soil for four to six days the tape is unwound to expose one hole at a time, from which the agar and invading fungus are transferred to a suitable medium.

Messiaen (C-M.). **L'influence des méthodes d'isolement et des milieux de culture dans l'échantillonage de la flora fongique des sols.** [The influence of isolation methods and culture media on the sampling of fungal flora of soils.]—*C. R. Acad. Agric. Fr.*, 43, 7, pp. 384–386, 1957.

To illustrate the influence of the technique used on assays of soil microflora [cf. 36, p. 125] the writer tabulated the families and genera of fungi obtained from the same soil type in south-western France by five different methods of isolation and culturing. The results obtained showed, *inter alia*, that *Aspergillus* spp. and *Penicillium* spp. were favoured by dilution methods on prune juice agar, while direct inoculation of soil particles on to the same medium or one with artificial humus favoured Mucoraceae, *Pythium* spp., and *Fusarium* spp. *Gibberella zeae* and *Rhizoctonia* [*Corticium*] *solani* were detected by incubating maize grains in soil and then isolating on prune agar.

Wilson (H. A.) & Stewart (Gwendolyn). **The number of bacteria, fungi, and actinomycetes in some strip-mine spoil.**—*Bull. W. Va agric. Exp. Sta.* 388 T, 15 pp., 1956.

At the West Virginia Agricultural Experiment Station, Morgantown, the fungi, bacteria, and actinomycetes present in four coal strip-mining areas were determined. Samples were taken from uncolonized spoil, the same levelled, fertilized, and sown with crops or trees, and adjacent undisturbed soil.

Twenty-two genera of fungi were identified, nine of which were found only in the spoil and three only in the soil. The numbers of micro-organisms were generally greater in colonized than in cultivated spoil, and more in the 4- to 8-in. layer of non-colonized spoil than in the top 4 in. In colonized spoil, however, regardless of the nature of the covering plants, numbers were larger in the top 4 in.

The numbers of certain physiological groups of bacteria present were assayed in the top 5 in. in two areas; *Azotobacter* was not found, though one spoil and one soil sample had a pH of 6 or over; nitrifying bacteria were absent from the two non-colonized and from one colonized area. Ammonifiers, denitrifiers, and cellulose decomposers were much more numerous in colonized than in non-colonized spoil, but the sulphur-oxidizers showed no definite trend, though in one area their numbers decreased concurrently with pH.

Halabuda (Mme T. V.) & Zhdanova (Mme N. N.). О видах рода **Mortierella** в почвах суборей окрестностей г. Киева. [On the species of the genus *Mortierella* in the soils of the pine-oak forests in the vicinity of Kiev.]—Укр. Бот. Журн. [*J. Bot. Acad. Sci. Ukr.*], 14, 1, pp. 60–68, 6 figs., 1957. [Russian and English summaries.]

During a survey from 1952 to 1954 of the soil fungi in mixed pine-oak forests in the vicinity of Kiev, U.S.S.R., *Mortierella ramanniana* [*Mucor ramannianus*] (in dry forests), *M. vinacea* (in semi-moist), and *M. isabellina* (in semi-moist and moist) were most frequently encountered. The new varieties, *M.v.* var. *grandispora*, *M.r.* var. *incrustacea*, and *M.r.* var. *atra*, were established.

Pestinskaya (Mme T. V.). Особенности биологии гриба **Pythium de Baryanum Hesse** и возможные пути подавления его в почве. [Biological peculiarities of the fungus *Pythium debaryanum* Hesse and possible ways of suppressing

it in the soil.]—Бот. Журн. [*J. Bot. U.S.S.R.* = *Bot. Zh. S.S.S.R.*], 41, 4, pp. 571–575, 1956.

Laboratory studies at the Pan-Soviet Institute of Plant Protection, Leningrad, U.S.S.R., have shown that *Pythium debaryanum*, causing black leg of beet [34, p. 763] and cruciferous crops and wilting of clover shoots, can be suppressed in the soil by saprophytic fungi which develop more rapidly than the parasite on plant debris therein. Of the 116 strains, belonging to 28 genera, tested against *P. debaryanum*, 27·6 per cent. were highly antagonistic and include *Coniothyrium trifolii* (all the three strains tested), *C.* sp. (four out of five strains), *Pestalotia hartigii*, *Fusarium merismoides*, *Penicillium* sp. (ten out of 14); *Gliocladium salmonicolor* (one out of 4), *Aspergillus* sp. (three out of five), *Monosporium* sp. (three out of seven), *Periconia* sp. (two out of four), and sterile mycelium (four out of 18). The intensity of antagonism increased with the increasing quantity of antagonistic micro-organisms in the soil.

Hafiz (A.), Akbar (K.), & Shariff (M.). **Colletotrichum capsici (Sydow) Butler and Bisby on Piper betle.**—*Biologia, Lahore*, 2, 2, p. 216, 1956.

A species of *Colletotrichum*, believed to be *C. capsici*, was isolated from wilting vines of *Piper betle* [cf. 36, p. 212] in an experimental plot on Manora Island, Karachi, Pakistan, in January, 1956.

Daly (J. M.) & Sayre (R. M.). **Relations between growth and respiratory metabolism in Safflower infected by Puccinia carthami.**—*Phytopathology*, 47, 3, pp. 163–168, 1 diag., 3 graphs, 1957.

The infection of safflower hypocotyls by *Puccinia carthami* [36, p. 275] was used at the University of Nebraska, Lincoln, to study the respiratory changes induced by parasitism [cf. 36, p. 95]. An approximate doubling of the rate of respiratory activity was accompanied by increases in length and weight of the invaded tissue, which rose to twice those of healthy hypocotyls during the vegetative growth of the parasite, weight diminishing and elongation ceasing when sporulation was in progress, with the accompaniment of a gradual diminution of the Pasteur effect (considered to be shown when the rates of anaerobic glycolitic fermentation exceed the aerobic). As sporulation began the ratio of anaerobic to aerobic production of carbon dioxide fell below the expected value of 0·33, though it was above this value during mycelial growth (but below that of healthy tissue). It was not clear whether the increased rates of respiration were attributable to the respiratory enzymes of the host or the parasite; high activity was associated with the pustules, but not with uninvaded tissue of an inoculated host.

The increased growth of the host would seem to eliminate the possibility of 'uncoupling' toxins playing a part in increased respiratory activity, this appearing to originate secondarily owing to a need for energy initiated by the disturbance of the hosts's metabolic growth processes. The inhibition of the Pasteur effect in diseased tissue results in part from increased aerobic carbon dioxide production without the rate of anaerobic production changing during mycelial growth of the parasite and in part from a change in the nature of the respiratory system during sporulation.

Antoine (R.). **Cane diseases.**—*Rep. Sug. Ind. Res. Inst., Mauritius, 1956*, pp. 50–60, 3 figs., 5 graphs [? 1957].

It is noted in this report [cf. 35, p. 845] that chlorotic streak virus of sugar-cane is rarely found in the dry localities of Mauritius except on heavy, poorly drained, irrigated soils. In an area where the disease is widespread the incidence of symptoms was low at the end of virgin growth although about 50 per cent. of the stools were infected; at the end of the first ratoon both stool infection and symp-

tom expression were high. Incidence was highest in the November plantings and lowest in the July, increasing again in those of September. In an experiment in which diseased and healthy plants were grown separately in drums there was apparently no transmission of the virus through the intermingling of the leaves.

In investigations on the two-hour hot-water treatment for the control of ratoon stunting virus [36, p. 2] 13 mins. elapsed before the temperature inside a cutting, 2·2 cm. in diameter, of M.134/32 reached that of the bath (50° C.), whereas for one of 6·1 cm. the interval was 75 mins., and for Ebene 1/37, 6·3 cm., it was 85 mins. The danger of treating too large cuttings is stressed. In a hot-air oven the highest air temperature (nearly 54°) was reached four hours after introducing the cuttings, and 50° was recorded inside a cutting after three hours, the whole cutting thus being maintained at this temperature for five of the eight hours of treatment. Hot-water treatment is preferable because of better temperature control.

Organo-mercurials were found to be better than non-mercurial fungicides for the control of pineapple disease [*Ceratocystis paradoxa*: 33, p. 633], a mercury level of 0·015 per cent. in the cold instantaneous dip being the most economic.

The effect of age on susceptibility to inoculation with *Physalospora* [*Glomerella*] *tucumanensis* [32, p. 613] was examined in M.112/34 and M.73/31. Under conditions of natural infection penetration occurs more readily in the less resistant M.73/31; once inside the shoot, however, the fungus spread at a similar rate in both varieties. The period of greatest susceptibility 15 to 17 months after planting was followed by one of resistance until 21 to 22 months, then by the ultimate breakdown of the cane.

Divinagracia (G. G.). **Marasmius stem rot of Sugar Cane.**—*Philipp. Agric.*, 40, 9, pp. 469–485, 5 figs., 1957.

A description is given of the distribution, symptoms, morphology, physiology, pathogenicity, host-range and control of *Marasmius* stem rot of sugar-cane (*Marasmius sacchari*) [18, p. 626], based on studies carried out at the College of Agriculture, Laguna, Philippines, from 1954 to 1956. The disease is a minor one in the Philippines but causes some reduction in yield.

The fungus grew best on potato dextrose, potato sucrose, and onion agars, but no sporophores were produced on any of the media tested. All of ten inoculated sugar-cane varieties became infected, some proving slightly more susceptible than others. Cross-inoculation experiments showed that several other graminaceous hosts, including sorghum, were susceptible.

Lindquist (J. C.). **Uredinales de las Sierras de Córdoba.** [Uredinales of the Córdoba Mountains.]—*Bol. Acad. Cienc., Córdoba*, 39, 4a, pp. 353–374, 1956.

This preliminary annotated list of rusts was made from specimens at the Instituto Botánica Spegazzini, Argentina [cf. 33, p. 689; 34, p. 752], and comprises 56 species, of which one, *Chrysocelis lupini* on *Lupinus paniculatus*, is a new record for Argentina.

Jørstad (I.). **Various rust species from Europe, North America and Australia.**—*Nytt Mag. Bot.*, 5, pp. 23–31, 1957.

Notes are given on some interesting European and North American rust fungi from the collection of Professor G. Lagerheim, now in the Swedish Museum of Natural History, Stockholm. *Puccinia graminis* on *Festuca varia* in Northern Italy apparently constitutes a new host record. The geographical ranges of some species have been extended.

Luttrell (E. S.). **Ascospore ejaculation in Gaeumannomyces graminis.**—*Phytopathology*, 47, 4, p. 242, 1957.

Microscopic examination of perithecia of *Ophiobolus graminis* on wheat leaf

sheaths in Georgia showed ascospore discharge to be forcible, of the '*Endothia* type'. Emission is described in detail. The asci emerge successively and eject their spores in rapid succession. Demonstration of this type of discharge supports the removal of this species from *Ophiobolus* and the placing of it in the Diaporthales [cf. 34, p. 260].

FLENTJE (N. T.) & SAKSENA (H. K.). **Studies on Pellicularia filamentosa (Pat.) Rogers. II. Occurrence and distribution of pathogenic strains.**—*Trans. Brit. mycol. Soc.*, 40, 1, pp. 95–108, 1 pl., 1957.

In further studies at the Waite Agricultural Research Institute, University of Adelaide, 68 isolates of *Pellicularia filamentosa* [*Corticium solani*] and 12 of *P. praticola* [*C. praticola*: cf. 36, p. 129] from England and South Australia were examined for pathogenicity to five host families, represented by wheat, lettuce, tomato, sugar beet, and cabbage. Of 54 isolates of *C. solani* that attacked stem structures of plants [35, p. 88] in inoculated soil, 49 showed host specialization and comprised three pathogenic strains, one attacking Compositae severely and Cruciferae mildly, a second confined to Cruciferae, and the third to Solanaceae. The other five isolates were less specialized. Thirteen attacking root structures only were not specialized though less severe on lettuce than on the other hosts. One isolate failed to infect any of the hosts tested. All the isolates of *C. praticola* were similar in pathogenicity, attacking all the hosts above 18° C., but only beet below.

Strains from five selected soil types, isolated by growing a range of seedlings and plating those with lesions, were frequently specialized to the particular host cultivated regularly in the area, though the cruciferous strain of *C. solani* occurred in all the soil types, whether or not a cruciferous crop was present. Correlation was lacking between pathogenicity and cultural characters, but isolates of a single strain from a given soil were generally similar in culture and readily distinguishable from other strains.

SARMAH (K. C.). **Tylose formation in Tea.**—*Indian Phytopath.*, 9, 1, pp. 23–50, 1 pl., 1956.

Studies carried out over a number of years at Tocklai Experimental Station, Assam, India, revealed that tylose formation can occur in the xylem vessels of tea plants killed by slow-acting fungi such as *Aglaospora aculeata* [cf. 32, p. 216], *Nectria* sp. [cf. 35, p. 400], *Poria hypobrunnea* [cf. 27, p. 260], *Helicobasidium compactum* [loc. cit.], and *Hypoxylon asarcodes* [cf. 30, p. 197]. Tyloses were never found in the healthy parts of the plant, and never in plants killed suddenly. Their formation appears to be related to the gradual shortage of water caused by the pathogens.

DE WEILLE (G. A.). **De fungicide werking van licht van verschillende golflengten ten aanzien van blister blight.** [The fungicidal effect of light of various wavelengths in relation to blister blight.]—*Bergcultures*, 26, 7, pp. 149, 151, 153, 155, 157, 1957. [English and Indonesian summaries.]

The following is a summary of the results of experiments performed at Kampung Baru, Sumatra, in 1956 to determine the possibility of combating blister blight of tea (*Exobasidium vexans*) by exposure to various sources of artificial light [cf. 34, p. 551]. In two tests with the General Electric ultra-violet 15-w. germicidal lamp, operating with maximum intensity on a wave-length of 2,357 Å, the sporulation of the fungus in Petri dishes was reduced from an average of 80 per cent. to 9 by one hour's exposure, and from 83 to 16 and 35 by 45 and 30 minutes, respectively. An hour's exposure to two Philips 'Repro' 145-w. photo-reproduction lamps with a total light strength of 2,350 to 2,400 Å also reduced spore germination from 89 to 14 per cent., but visible and infra-red light appeared to be inactive.

Klein (E-K.). **Über den Einfluß der Mineralsalzernährung auf den Gehalt des Blattes an freien Aminosäuren und Monosacchariden und seine Bedeutung für die Empfänglichkeit der Pflanze gegenüber parasitären Pilzen. I. Über den Einfluß verschiedener Mineralsalzernährung auf den Gehalt des Blattes an freien Aminosäuren und Monosacchariden und ihr papierchromatographischer Nachweis. II. Untersuchungen über das Wachstum parasitärer Pilze in künstlichen und natürlichen Nährlösungen mit einer der verschieden ernährten Wirtspflanze entsprechenden Zusammensetzung.** [On the influence of mineral salt nutrition on the leaf content of free amino acids and monosaccharides, and its significance with respect to the susceptibility of the plant to parasitic fungi. I. On the influence of varying mineral salt nutrition on the leaf content of free amino acids and monosaccharides, and their demonstration by paper chromatography. II. Investigations of the growth of parasitic fungi in artificial and natural nutrient solutions with a composition corresponding to that of the host plant under varying conditions.]—*Jb. bayer. Landw.*, 33, 2, pp. 224–241, 2 figs.; 3, pp. 347–367, 1 fig., 1956.

At the Bayerische Landesanstalt für Pflanzenbau und Pflanzenschutz, Munich, paper-chromatographic analyses of leaf extracts of tobacco plants showed that disturbances of protein synthesis or rapid protein breakdown led to an increase of free amino acids; with excess nitrogen they were plentiful. Potassium deficiency caused a rapid and immediate build up of glutamine and asparagine, and later of amino acids. With phosphorus deficiency amino acids increased and then decreased. With deficiency of nitrogen or calcium, coupled with excess potassium, phosphorus, or calcium, the level of amino acids was usually lower than in control plants receiving the basic nutrient solution. Supplementary ammonium nitrogen increased free amino acids, particularly glutaminic acid and glutamine. Glucose and fructose were always present in equal proportions except where there was deficiency of nitrogen. Only when potassium was deficient were constantly high sugar levels recorded.

In a preliminary experiment the tobacco pathogens *Alternaria longipes*, *Cercospora nicotianae*, and *Sclerotinia sclerotiorum* were cultured on a leaf extract medium and the uptake of sugar and amino acids was followed by paper chromatography. Growth in media of which the composition reflected that of tobacco tissues receiving carbon and nitrogen in various proportions was then compared by determining mycelial dry weight after ten days. Good growth was found to be correlated with susceptibility of the corresponding plant tissues. An increase in the supply of nitrate and ammonia, by raising the content of glutamine and glutaminic acid, was partly responsible for the increased susceptibility of the plants. *A. longipes* and *C. nicotianae*, both leaf parasites, preferentially utilize amino acids, glucose and fructose, glutamine and glutaminic acid being of special importance. *S. sclerotiorum*, which more usually attacks the stems, utilizes mainly pectin and ammonium nitrogen, glucose and amine nitrogen being less important. Growth of *S. sclerotiorum* was chiefly dependent on a suitable and plentiful supply of carbon. Potassium deficiency induced deficiency of sugar in the host tissues and the phosphorus supply determined the availability of sugar.

Koch (L. W.). **Tobacco diseases in Canada. Their occurrence, relative importance and measures for control.**—*Lighter*, 26, 4, pp. 10–16, 1956.

In an address to the Tobacco Workers' Conference, London, Ontario, 1956, the author stated, *inter alia*, that black root rot (*Thielaviopsis basicola*) [35, p. 815; 36, p. 205] is the most important disease of tobacco in Canada, while damping-off (*Pythium* spp. and *Rhizoctonia* spp.) is most consistently destructive to seedlings. Blue mould (*Peronospora tabacina*) occurs in Ontario [25, p. 14] but not in Quebec; incidence has decreased continuously since 1946. Tobacco mosaic [34, p. 753] is

the most prevalent virus disease on flue-cured varieties, while tobacco etch [31, p. 520] is most widespread and destructive on Burley and sometimes on dark tobacco.

Berbeć (J.) & Berezowski (B.). **Badania nad możliwością zastosowania niektórych zabiegów chemicznych i agrotechnicznych przy zwalczaniu chorób Tytoniu w warunkach naszego kraju. Puławy 1950–1952.** [Studies on the possibility of applying certain chemical and agrotechnical means of controlling Tobacco diseases under Puławy conditions in 1950–1952.]—*Roczn. Nauk rol.*, A 70, 3, pp. 431–441, 1955. [Russian and English summaries. Abs. in *Referat. Zh. Biol.* 6, p. 205, 1957.]

Treating tobacco roots before planting in Poland with 1 per cent. Bordeaux mixture was effective against root rot (*Thielaviopsis basicola*) [33, p. 453] in the Meidol variety alone in 1951, reducing infection from 17·1 per cent. (untreated) to nil. Treatment with 0·5 per cent. Bordeaux mixture was less effective.

Gigante (R.). **La virescenza ipertrofica del Tabacco.** [Hypertrophic virescence of Tobacco.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, 14 (*1956*), 1, pp. 21–32, 7 figs., 1957. [English summary.]

This paper, describing an outbreak of tomato big bud virus on tobacco near Rome, has already been noticed from another source [36, p. 138].

Garces-Orejuela (C.) & Pound (G. S.). **The multiplication of Tobacco mosaic virus in the presence of Cucumber mosaic virus or Tobacco ringspot virus in Tobacco.**—*Phytopathology*, 47, 4, pp. 232–239, 1 fig., 4 graphs, 1957.

At the University of Wisconsin, Madison, tobacco mosaic virus was inoculated into one half of Connecticut Havana 38 tobacco leaves and either cucumber mosaic virus or tobacco ring spot virus into the other half, the results being compared with infection by each virus alone [cf. 34, p. 431; 35, p. 743]. Cucumber mosaic virus was assayed on Black cowpea leaves; tobacco mosaic virus was separated by differential centrifugation and assayed on a tobacco variety having the 'local lesion' gene of *Nicotiana glutinosa*; tobacco ring spot virus concentration was not determined.

The symptoms of the two mosaic viruses were initially distinguishable (those of the former in the top leaves and of the latter lower down), but were soon combined, producing together extreme stunting. A cyclic pattern of symptoms in the tip leaves of both singly and doubly infected plants was noticeable, severe symptoms associated with high concentrations of virus alternating with partial recovery and low concentrations [cf. 36, p. 135]. The peak of tobacco mosaic virus in doubly infected plants occurred about one week later than in those with tobacco mosaic virus alone; the decline after the peak was less marked, suggesting that the synthesis of tobacco mosaic virus is initially depressed by the presence of cucumber mosaic virus.

Cucumber mosaic virus was more concentrated four days after inoculation in singly than in doubly infected plants, but after two weeks this was reversed, symptoms then being severe. After three weeks and thenceforward, concentration was generally greater in singly than doubly infected plants, the latter resuming growth.

Increasing the levels of nutrient nitrogen and phosphorus did not affect the general symptom picture, but caused an increase in tobacco mosaic virus in all plants, though it did not alter the cucumber mosaic virus concentration. It is apparent that the reduced synthesis of tobacco mosaic virus at the start of double infection may be due to a drain of nitrogen by the cucumber mosaic virus at this stage [cf. 33, p. 264]. Possible interpretations of the observed phenomena concerning virus synthesis in relation to nutrient supply are discussed in detail.

Combined infection with tobacco mosaic and ring spot viruses produced a combination of the symptoms produced by either alone and a degree of stunting that varied in intensity. There was again a cyclic pattern of severe followed by milder symptoms in the tip leaves, but it was less clearly defined, varying in individual plants. Tobacco mosaic virus concentration was always higher in doubly than in singly infected plants, and more so after one and two weeks than after three or four. In each of the combinations tested neither virus was able completely to inhibit increase of the other, and the enhanced symptoms were an additive effect of the two combined.

Boyle (J. S.) & Wharton (D. C.). **The experimental reproduction of Tomato internal browning by inoculation with strains of Tobacco mosaic virus.**—*Phytopathology*, 47, 4, pp. 199–207, 1 col. pl., 1957.

The results are presented of investigations carried out from 1952 to 1955 at the Pennsylvania State University, University Park, into internal browning of tomatoes and its relation to tobacco mosaic virus [29, p. 63; 34, p. 406 and next abstract]. In addition to fruit symptoms previously described, an accompanying slight chlorosis or mottling of the terminal leaves of affected plants was usually (though not universally) noted. Experiments showed that early infection of tomato plants with tobacco mosaic virus prevented internal browning from developing, that the condition was not transmitted by vegetative propagation, and that it was not correlated with varying fertilizer applications or the use of any of a large selection of fungicides. Of nine tomato varieties developing internally browned fruit, incidence varied from 59·9 per cent. in Brookston to 6·6 in Jubilee, but varietal reaction was not critically examined; the occurrence of the condition was independent of environmental extremes of temperature and humidity.

In 1955, having taken every precaution to avoid previous infection of tomato plants by tobacco mosaic virus, the authors inoculated them when the fruit was beginning to ripen with isolates of the virus obtained from internally browned fruit; this resulted in the appearance of internal browning and in one test 93·5 per cent. of the plants developed browning symptoms in 14 per cent. of the fruit. Other strains of tobacco mosaic virus also caused fruit browning but incidence was lower and the symptoms less severe than with the isolate from browned fruit. The results indicate that internal browning is a shock reaction, resulting from late infection with the virus bringing about virus accumulation in some of the fruit, where a hypersensitive response occurs.

Wharton (D. C.) & Boyle (J. S.). **The pathological histology of the internal browning disease of the Tomato.**—*Phytopathology*, 47, 4, pp. 208–212, 4 figs., 1957.

In tomato fruits affected by internal browning caused by tobacco mosaic virus [see preceding abstract] tissue discoloration due to browning of the walls of affected cells was found to be the major abnormality. It radiated from the stem end and was confined as a rule to the outer fleshy pericarp, but sometimes affected the septa and central column in severe cases. Collapse of the thin-walled parenchyma may also occur. The condition is worst in tissues between the vascular bundles, which are not themselves affected. The cytoplasm of affected cells becomes particulate, and nuclei are absent. These conditions do not occur in plants affected in the usual way by tobacco mosaic virus or in symptomless fruit accompanying browned fruit. Apparently the symptoms are induced by a change in the enzyme-catalyzed reactions which upsets the normal physiological processes of the fruit.

Day (P. R.). **Mutation to virulence in Cladosporium fulvum.**—*Nature, Lond.*, 179, 4570, pp. 1141–1142, 1957.

At the John Innes Horticultural Institution, Bayfordbury, Herts., conidia of the

avirulent race 0 of *Cladosporium fulvum* [35, p. 656] were treated with a mutagen in an attempt to bring about a conversion to race 2 and inoculated to Vetomold tomato, resistant to race 0. The strain of race 0 used carried an X-ray marker so that it could be distinguished from contaminants; its host-range was wild type, but it produced red pigment instead of purple.

Preliminary reconstruction experiments showed that with about ten conidia per ml. of race 2 (virulent in Vetomold) the absolute number of lesions was reduced by the presence of race 0 in proportion to the concentration of the latter over the range 5×10^4 to 10^6 per ml., the lowest number of virulent conidia in the highest concentration of live avirulent conidia to give one lesion being about 17 per 10^6 at 5×10^5 per ml.

When the plants were inoculated directly with suspensions of race 0 conidia treated with X-rays or ultra-violet radiation to give 90 to 95 per cent. kill, no virulent mutants were obtained. It was therefore decided to irradiate five-day old cultures and inoculate four days after treatment. Among 11 isolates from resulting lesions on Vetomold, ten were contaminants but the other was indistinguishable from the initial red strain except for its virulence on Vetomold; it is therefore accepted as a mutant of race 0.

It is concluded that since mutations to virulence can be obtained by radiation, unintentional treatment of pathogens present when host plants are treated may result in an increase in virulence which may more than offset host improvements.

Alexander (L. J.) & Hoover (M. M.). **Disease resistance in wild species of Tomato : report of the National Screening Committee.**—*Bull. Ohio agric. Exp. Sta.* 752, 76 pp., 1955. [Received 1956.]

This bulletin reports further results of the screening programme carried out in 1952 and 1953 [32, p. 700; 36, p. 139] with the object of selecting tomato accessions which gave promise of disease resistance. Data were provided by 61 co-operators in the United States and Canada. In all 1100 accessions (144 wild species and suspected crosses) considered likely to possess immunity or high resistance were selected for screening. Disease rating (from 0, immune, to 5, susceptible) was based on seedling tests and usually on artificial inoculation.

The highest type of resistance to *Septoria* leaf spot (*S. lycopersici*) was shown by accessions of *Lycopersicon glandulosum*, but none possessed class 1 resistance. No. 129152 of *L. peruvianum* possessed the highest resistance (rating 1 or 2) to *Stemphylium* blight (*S. solani*) [35, p. 553]. No. 115201 unnamed tomato variety from the U.S.S.R. showed the highest (class 1) resistance to *Phoma destructiva*. The best possibility for resistance to tobacco mosaic virus was found in *L. peruvianum* [36, p. 282].

No accession showed higher resistance to *Alternaria solani* [36, pp. 139, 429] than that of several European varieties or Southland and Manalucie [35, p. 402], but 127833 of *L. pimpinellifolium* was agreed by most co-operators to be markedly resistant. A species cross, 114038, possessed the best type of resistance to anthracnose (*Colletotrichum phomoides*). Most accessions proved susceptible to bacterial wilt (*Pseudomonas solanacearum*) [32, p. 671], but 143552 of *L. pimpinellifolium* appeared to have low resistance.

Accessions 110595, 126432, and 205009 of *L. pimpinellifolium* and 38 of species crosses proved resistant to the common races of blight (*Phytophthora infestans*) [35, p. 217] and species cross 204996 was also resistant to other races occurring in Florida and West Virginia. These accessions were also screened for resistance to buckeye rot (*P. parasitica*); the detached fruits of 205004, 205011, 205016, 205022, 205026–8, and 205031, all red-fruited species or crosses between them, were not infected by zoospore inoculation.

Resistance to leaf mould (*Cladosporium fulvum*) [35, p. 52] is complicated by

several races of the pathogen, but 128652, 128657, and 129146 of *L. peruvianum*, 112215 of *L. pimpinellifolium*, and one species cross, 114967, were highly resistant. Resistance to *Verticillium* wilt (*V. albo-atrum*) was very variable, but 27 accessions were listed as probably resistant in some degree [cf. 34, p. 10].

Waggoner (P. E.) & Dimond (A. E.). **Altering disease resistance with ionizing radiation and growth substances.**—*Phytopathology*, 47, 3, pp. 125–130, 4 graphs, 1957.

Further studies at Connecticut Agricultural Experiment Station, New Haven, compared the effects of growth substances and X-radiation [32, p. 517; 35, p. 727] on the resistance of the tomato varieties Bonny Best (highly susceptible), Pritchard (multiple-gene-resistant), and Pan American (single-gene-resistant) to wilt (*Fusarium oxysporum* f. [*F. bulbigenum* var.] *lycopersici*). Disease severity was graded according to the degree of vascular discoloration [33, p. 644]. Shoot irradiation by exposure to 18 Kr. 10^3 röntgens) decreased the resistance of all three varieties, but similar root irradiation two to four days prior to inoculation increased resistance; a similar result was obtained with naphthalene acetic acid. Indole acetic acid increased resistance in non-irradiated plants and to a great extent prevented loss of resistance due either to whole plant irradiation at the time of inoculation or to treatment with maleic hydrazide [32, p. 474; 33, p. 642].

Exposure of the plants to metabolic inhibitors [cf. 35, p. 51] either before or after root irradiation did not inhibit resistance. In the course of these experiments *p*-chloromercuribenzoate was found to have potential qualities as a chemotherapeutant. Shoot irradiation decreased resistance of both stem and roots shielded from it by lead, and resistance was not conferred on Bonny Best cuttings by root irradiation nor on plants when only part of the root system was irradiated. Resistance resulting from root irradiation or naphthalene acetic acid treatment attained a maximum after two to eight days, its appearance and disappearance being slower at 18° C. than at 27°. Decreases in resistance due to shoot irradiation and maleic hydrazide varied with the period elapsing between treatment and inoculation.

The additional resistance conferred by naphthalene acetic acid, which lasts for at least 16 days, may prove of practical value in protecting transplants; that conferred by radiation lasts only about a week.

The results are discussed with regard to the nature of resistance to *Fusarium* wilt [cf. 36, p. 284]; they are considered to be consistent with the hypothesis of the production of an inhibitor of resistance by roots, particularly by Bonny Best, and a stimulator of resistance by shoots, but the nature of these substances remains unknown.

Parfilova (Mme M. E.). Эффективность применения хлорокиси меди для борьбы с болезнями Томатов. [Effectiveness of applying copper oxychloride for the control of Tomato diseases.]—Науч. Зап. Львовск. сельскохоз. Инст. [*Nauch. Zap. L'vov selskohoz. Inst.*], 5, pp. 172–175, 1955. [Abs. in *Referat. Zh. Biol.* 6, p. 203, 1957.]

In experiments in the L'vov region of the U.S.S.R. four applications of copper oxychloride dust, even under very wet conditions, reduced septoriosis [*Septoria lycopersici*: 15, p. 538] of tomato from 35 (control) to 1 per cent. and fruit rot (macrosporiosis) [*Alternaria solani*: 35, p. 335] from 13 to 1·4 per cent. Tomatoes from treated plants contained 8·1 per cent. more malic and 9·1 per cent. more ascorbic acid than did those from the untreated.

Miller (J. H.). **Elsinoe on Southern Red Oak.**—*Mycologia*, 49, 2, pp. 277–279, 1 fig., 1957.

At the Department of Plant Pathology and Plant Breeding, University of

Georgia, Athens, the author isolated from spotted leaves of southern red oak (*Quercus falcata*) from Georgia and North Carolina *Elsinoe quercus-falcatae* n. sp., with globose asci 20 μ in diameter and hyaline, 2- to 4-celled ascospores 11 to 14 by 4 to 6 μ. The disease caused yellowing of the leaves followed by some defoliation and death of heavily infected branches.

Levisohn (Ida). **Antagonistic effects of Alternaria tenuis on certain root-fungi of forest trees.**—*Nature, Lond.*, 179, 4570, pp. 1143–1144, 1 fig., 1957.

At Bedford College, University of London, two strains of *Alternaria tenuis*, isolated from forest nursery arable soils and found to be antagonistic to ectotrophic mycorrhiza of forest trees, were grown in mixed cultures on a synthetic medium with mycorrhizal fungi. *Boletus granulatus* [33, p. 494], *B. variegatus* [34, p. 666], *B. bovinus* [34, p. 478], and *Rhizopogon luteolus* [loc. cit.] were inhibited, the first two markedly so; *B. scaber* [35, p. 644] was only mildly retarded. Pseudomycorrhizal fungi, such as *Mycelium radicis-atrovirens* [35, p. 839], were not affected.

It is suggested that the antagonism of *A. tenuis* to mycorrhiza-formers may be correlated with the poor growth of young trees not forming true mycorrhizal associations but having a profusion of pseudomycorrhizal infections.

Partridge (A. D.) & Rich (A. E.). **A study of the Ash leaf rust syndrome in New Hampshire, suscepts, incitant, epidemiology, and control.**—Abs. in *Phytopathology*, 47, 4, p. 246, 1957.

Ash rust (*Puccinia peridermiospora*) [*P. sparganioides*: 27, p. 502; 36, p. 218] has increased in severity in New England. High humidity for three to four hours initiates basidiospore production (optimum temperature being 54° to 70° F.), but six to eight hours of damp air in gentle movement are required for infection of ash, which occurs chiefly between 15th May and 20th June. The main period for infection of *Spartina* spp. is from 20th July to 20th August, dry, hot weather at this time lessening epiphytotics. Pycnidial and aecidial infection was observed on *Fraxinus americana*, *F. pennsylvanica* and its var. *lanceolata*, and *F. nigra*, with no difference in tolerance or resistance. Uredo and teleuto infections were found on *Spartina alterniflora*, *S. patens*, and *S. pectinata*.

Of 26 fungicides tested, 12 were phytotoxic to ash and eight gave poor control, but Bordeaux mixture, dichlone, griseofulvin, mycostatin, and ziram all showed some promise.

Pawsey (R. G.). **The overwintering of Keithia thujina, the causal agent of Cedar leaf blight.**—Abs. in *Trans. Brit. mycol. Soc.*, 40, 1, pp. 166–167, 1957.

In the winter of 1955–6 incipient apothecia of *Didymascella thujina* were found on old leaf lesions on nursery plants on *Thuja plicata* [35, p. 556; 36, p. 220] in Britain. Ascospores discharged from them at maturity were not, however, responsible for spring infection, which appeared to be caused primarily by ascospores overwintering on or between the leaves.

Thie (H.). **Pilzkalamität an Blaufichte.** [A fungal calamity for the Blue Spruce.]—*Forst- u. Holzw.*, 11, 10, pp. 208–209, 1956.

Attention is drawn to a severe needle discoloration of blue spruces in 18- and 30-year-old stands in the Brilon district (Sauerland), Germany, which is presumed to be of fungal origin [see next abstract].

Witter. **Zu 'Pilzkalamität an Blaufichten'.** [On the 'fungal calamity for Blue Spruces'.]—*Forst- u. Holzw.*, 11, 19, p. 431, 1956.

Commenting on the needle disease of blue spruces in Sauerland, Germany [see preceding abstract], the writer reports the occurrence of a similar epiphytotic in

Schleswig-Holstein in 1949. A *Lophodermium* species was suspected [cf. 34, p. 760], but microscopic examination of affected needles at the Forest Botany Institute of Göttingen University did not uphold this diagnosis, and the trouble was accordingly referred with some reservation to the after-effects of the drought of 1947.

Hahn (G. G.). **A new species of Phacidiella causing the so-called Phomopsis disease of conifers.**—*Mycologia*, 49, 2, pp. 226–239, 2 figs., 1957.

An account is given of the author's studies of the perfect state of *Phomopsis pseudotsugae* [cf. 34, p. 419], *Phacidiella coniferarum* n. sp., found in Maine on living and dead trunks and branches of *Pinus strobus* from August, 1931, to May, 1935.

Ascocarps were associated with pycnidia in the same stroma and cultures from the ascospores were identical with those of the imperfect state. The cylindrical to club-shaped, elongate-stalked, thin-walled asci measure 80 to 135 by 8 to 12 μ, the continuous, occasionally uni- or bi-septate, hyaline, guttulate, elliptical or elliptic-fusiform ascospores have obtuse or subacute ends and measure 10 to 18·8 by 2·8 to 6 μ, and the short, elliptic or rod-shaped, continuous, hyaline bud spores produced in the ascus are 3·4 to 4·8 by 1 to 1·6 μ. The imperfect state is renamed *Phacidiopycnis pseudotsugae* (M. Wils.) n. comb.

Jewell (F. F.). **Preventing cone rust on Slash Pine by pollination techniques used in breeding programs.**—*Phytopathology*, 47, 4, pp. 241–242, 1 fig., 1957.

Observations by the Southern Institute of Forest Genetics, Gulfport, Mississippi, showed that infection of cones of slash pine (*Pinus elliottii*) by *Cronartium strobilinum* [35, p. 797] was entirely eliminated from those bagged from the time they break out of the sheath until 10 days after artificial pollination, indicating that infection normally takes place when the cone scales open during the pollinating period.

Cram (W. H.) & Vaartaja (O.). **Rate and timing of fungicidal soil treatments.**—*Phytopathology*, 47, 3, pp. 169–173, 1957.

In further investigations at the Forest Nursery Station, Indian Head, and the Forest Pathology Laboratory, Saskatoon, Saskatchewan, on the control of damping-off of tree seedlings [cf. 36, p. 216], seed of Colorado spruce (*Picea pungens*), Scots pine (*Pinus sylvestris*), and *Caragana arborescens* was sown in soil inoculated with *Rhizoctonia* [*Corticium*] *solani* and naturally infected by *Pythium debaryanum* and then treated with orthocide 75 or tersan [35, p. 856] as surface drenches at 0·1, 0·5, 2·5, and 10 gm. per sq. ft. (approximately $\frac{1}{100}$ of the rate expressed in lb. per acre) at different intervals of time. Soil moisture was maintained at 70 to 80 per cent.; air temperature varied from 10° to 30° C. In the untreated average germination was 75 per cent. and seedling mortality 54 per cent. In another experiment seed of *Picea pungens* and *Caragana arborescens* was either pelleted with tersan (two parts in one part aqueous methyl cellulose [35, p. 406] to 20 parts seed) or drenched initially with tersan at 0·6 or 0·1 gm. per sq. ft., both lots being subsequently drenched at 0·1 gm. Control germination was 80 and mortality 41 per cent.

The heaviest rates of drenchings and pelleting considerably reduced the speed of germination, partly from phytotoxicity and in part from the crusting of the soil surface induced by the chemicals. The lowest rate of both fungicides (applied weekly nine times) resulted in the highest stands. Good control was given by 0·1 gm. per sq. ft., but on the whole the best treatment appeared to be an initial heavy drench at about 0·5 to 0·6 gm. per sq. ft. with six subsequent applications at 0·1 gm. at intervals of one or two weeks. Both fungicides proved more toxic to the pathogenic than to the saprophytic soil fungi and both favoured the growth of bacteria.

Fomes annosus : a fungus causing butt rot and death of Conifers.—*Leafl. For. Comm., Lond.*, 5, 10 pp., 3 pl., 2 figs., 1957.

This revised leaflet [cf. 25, p. 428] deals with conifer butt rot (*Fomes annosus*) [35, p. 133 and following abstracts] under the headings: life-history, fructification, butt-rot damage, conditions determining stump infection, resistance and susceptibility, and control measures. About 90 per cent. of conifer decay in the United Kingdom is due to this fungus.

Peace (T. R.). **The control of diseases in the forest.**—Abs. in *Trans. Brit. mycol. Soc.*, 40, 1, p. 166, 1957.

After pointing out that the environment of the forest generally prevents the control of diseases on lines suited to agricultural crops, the author notes some indirect methods of control, such as choice of species and of site and adaptations of silvicultural practices, including removal of diseased trees when thinning. Only rarely, with valuable timber, is eradication worth while. Fungicidal treatment of stumps to control *Fomes annosus* [see preceding and next abstracts] is practised and certain individual trees may be worth protection from root fungi by trenching.

Rishbeth (J.). **Fomes annosus on stumps.**—Abs. in *Trans. Brit. mycol. Soc.*, 40, 1, p. 167, 1957.

In an experiment begun in 1947 on the control of *Fomes annosus* on pine [in East Anglia: see preceding abstracts] by chemical treatment of stumps at thinning [cf. 31, p. 640] paint or creosote treatment has proved 97 per cent. effective in preventing the death of standing trees in the plot with the highest natural stump infection, and the effectiveness of the treatments in general was 86 per cent. The drought of 1955 reduced stump infection by *Peniophora gigantea* but increased that by *F. annosus*, spore production of which was little affected [cf. 35, p. 231].

In East Anglian plantations current losses average nearly 7 per cent. at the second thinning. Early infection depends largely on the result of competition between species on the cut surface. Protectants may exclude all fungi at first; some microflora may prove tolerant of the protectant; or modification of the timber may induce a more varied micro-flora. For example, *Trichoderma viride* has assumed dominance after treatment with 40 per cent. ammonium sulphamate and *Botrytis cinerea* after sodium chlorate.

Birkinshaw (R. H.), Chaplen (P.), & Findlay (W. P. K.). **Biochemistry of the wood-rotting fungi. 9. Volatile metabolic products of Stereum subpileatum.**—*Biochem. J.*, 66, 1, pp. 188–192, 1957.

This further contribution to the current series [34, p. 689] is concerned with *Stereum subpileatum* (No. 271) [18, p. 360], which was isolated from a beer-barrel of Persian oak (*Quercus castanaefolia*) and cultured on malt extract and a glucose-marmite-inorganic salts medium. The fungus, which caused contamination of the beer, has a penetrating odour like cheap scented soap, attributable mainly to 5-methoxycoumarone.

Panek (E.). **Influence of fungus infection associated with chemipeeling on pressure impregnation and cold soaking of Jack Pine posts.**—*For. Prod. J.*, 7, 4, pp. 124–127, 2 graphs, 1957.

At the Forest Products Laboratory, Madison, Wisconsin, in 1955, air-seasoned jack pine (*Pinus banksiana*) posts, from arsenic-poisoned and unpoisoned trees, chemi-peeled and infected by *Trichoderma*, blue-stain, and other [unspecified] fungi, were treated by cold-soaking [35, p. 567] and pressure impregnation [35, p. 857]. Control posts and groups of posts from poisoned and unpoisoned trees treated to discourage mould growth retained an average of 0·8 to 1·2 lb. preservative per cu.

ft. whereas those from unpoisoned trees, treated to encourage mould growth, and from poisoned trees cut after an opportunity for infection retained 6·1 and 9 lb., respectively, all cold-soaked for six hours.

Retention in pressure treated posts varied, the difference between the infected and uninfected being less, but still sufficient to justify their segregation for treatment.

It is concluded that fungus infection associated with the use of arsenic in chemipeeled posts significantly improves preservative penetration in cold-soak treatments.

Belenkov (D. A.) & Petri (V. N.). Токсичность фтористого натрия для домовых грибов при антисептировании им древесины различных пород. [Toxicity of sodium fluoride to house fungi when different wood species are antiseptically treated with it.]—Сборн. Труд. Фак. мех. Технол. Древес. Уральск. лес.-тек. Инст. [*Bull. Fac. mech. wood Technol. Uralsk. for. tech. Inst.*] 1, pp. 52–58, 1956. [Abs. in *Referat. Zh. Biol.* 6, p. 199, 1957.]

Timbers treated with sodium fluoride were tested in the U.S.S.R., using *Coniophora cerebella* [*C. puteana*], *Serpula* [*Merulius*] *lacrymans*, *Coriolus vaporarius* [*Poria vaporaria*], and *Fomitopsis* [*Fomes*] *pinicola*. The strength required for birch wood against *C. puteana* was 0·42 per cent. dry salt to the dry weight of the wood; for cedar, lime [*Tilia*], and aspen [*Populus* sp.] it was 0·527 to 0·577 per cent.; for spruce 0·756 per cent.; and for silver fir [*Abies*] 1·003 per cent. These fungi were able to destroy the wood even under the conditions of high moisture content.

Etheridge (D. E.). **Differentiation of white- and brown-rot fungi by an oxidase reaction.**—*Nature, Lond.*, 179, 4566, pp. 921–922, 1957.

While most brown- and white-rot fungi can be differentiated by the Bavendamm reaction [18, p. 360], the author has recently shown that certain [unspecified] brown-rot and non-rotting species can also produce an oxidase reaction on gallic and tannic acid media. He now reports that such inconsistencies were not observed when wood-meal, treated with ether and acetone to remove phenolic substances, was used as a substrate. The browning reaction of this meal can be used as a simple test to differentiate brown- and white-rot fungi.

Tannic or gallic acid, but not extracted wood-meal, can be oxidized by phenolase produced by isolates of *Coniophora puteana*, *Coryne sarcoides*, and *Stereum sulcatum*.

Tupenevich (S. M.) & Shirko (V. N.). Изучение заболеваний семеников Капусты. [A study of Cabbage seedling diseases.]—Сборн. Раб. Инст. прикл. Зоол. Фитопат. [*Bull. Inst. appl. Zool. Phytopath.*] 4, pp. 147–154, 1956. [Abs. in *Referat. Zh. Biol.* 6, p. 203, 1957.]

Botrytis cinerea [cf. 32, p. 412] and to a lesser extent *Alternaria brassicae* are stated to be chiefly responsible for seedling diseases of cabbage in the U.S.S.R. [35, p. 255]. Control measures are indicated.

Beemster (A. B. R.). **Onderzoekingen over een virusziekte bij Stoppelknollen (Brassica rapa var. rapifera).** [Studies on a virus disease of Turnips (*Brassica rapa* var. *rapifera*).]—*Tijdschr. PlZiekt.*, 63, 1, pp. 1–12, 1 fig., 1957. [English summary.]

The virus disease which caused such heavy damage to turnip crops in the south-east of the Netherlands in 1949 [29, p. 450] has not reappeared since that date. Sap inoculation experiments revealed a wide host range, including red, white, Savoy, and Chinese cabbage, kohlrabi, cauliflower, mustard, watercress, *Matthiola annua*, *Lunaria biennis*, White Burley tobacco, *Nicotiana glutinosa*, *N. langsdorffii*,

N. rustica, *N. sylvestris*, *Petunia hybrida*, *Physalis floridana*, *Gomphrena globosa*, and *Zinnia elegans*. Spontaneous infection was observed on cauliflower, mustard, *L. biennis*, and *M. annua*. The symptoms induced by the virus on some of its hosts are described. Tobacco reacts by local necrosis three to four days after inoculation.

The thermal inactivation point of the virus lies between 56° and 58° C., its dilution end point is 1 in 1,000, and longevity *in vitro* extends over two to three days. It was transmissible by *Myzus persicae* and *Brevicoryne brassicae*, in which it was non-persistent, from turnip to turnip and tobacco. These results confirm that the virus is referable to Walker's turnip virus 1 [turnip mosaic] group [loc. cit.]. Rabbit antiserum did not react with the virus causing 'speck' of cabbage in the Netherlands [32, p. 528], which was identified as that of cauliflower mosaic.

It was demonstrated that the turnip mosaic symptoms are much more severe at 20° to 25° than at a lower range; they were not apparent at 15°, but necrosis developed within three days after transference to a warmer atmosphere. This is in line with the attribution of the epiphytotic to the exceptionally high September temperatures of 1949.

Ernould (L.) & Van Steyvoort (L.). **La végétation, les ennemis et les maladies de la Betterave en Belgique en 1955 ; . . . en 1956.** [The growth, pests, and diseases of Beetroot in Belgium in 1955; . . . in 1956.]—*Publ. Inst. belge Amélior. Better.*, 24, 2, pp. 99–137; 4, pp. 167–203, 1956. [Flemish and English summaries.]

In general, sugar beet diseases were not particularly troublesome in Belgium in either 1955 or 1956 [cf. 34, p. 693], but manganese excess and deficiency were both responsible for heavy damage in 1956. Yellows virus developed later than usual in 1956 but was definitely more severe in the west and north-west than in 1955; elsewhere, it was much milder, especially in Hesbaye (20 per cent. infection as against 46 in the preceding year). For the beet-growing areas as a whole the incidence of the virosis in mid-September was 41 per cent. in 1956 compared with 46 in 1955.

Semal (J.). **Données nouvelles sur la transmission des virus de la Betterave par Myzus ascalonicus Doncaster.** [New data on the transmission of Beet viruses by *Myzus ascalonicus* Doncaster.]—*Parasitica*, 13, 1, pp. 1–12, 1957. [English summary.]

In studies at the Laboratory of Phytovirology, Gembloux, Belgium, the viruses of beet mosaic [loc. cit.], beet yellows [loc. cit.], and cucumber mosaic [25, p. 492] were experimentally transmitted to beet by *Myzus ascalonicus* [cf. 33, p. 331], which had overwintered on chickweed (*Stellaria media*) in a field adjoining one where fodder beet had been harvested. Beet mosaic virus was also transmitted from beet to beet by the aphid.

Münster (J.). **La jaunisse de la Betterave.** [Beet yellows.]—*Rev. rom. Agric.*, 13, 4, pp. 25–27, 4 figs., 1957.

Studies at the Federal Agricultural Stations, Lausanne, from 1950 to 1956 on the distribution and incidence of beet yellows virus in Switzerland [34, p. 211] showed that the Wavre-Marin plateau, near Lausanne, is the most severely affected part of the country, incidence being between 30 and 40 per cent. in 1952 and often nearly 100 per cent. since. Beet stored in cellars or in open-air silos is the principal winter reservoir in Switzerland.

Dontsova (Mme R. G. V.). Сухой склероциоз Сахарной Свёклы по наблюдениям на Рамонской опытно-селекционной станции. [Dry sclerotiosis of Sugar Beet according to observations at the Ramon Experiment Selection Station.]—

Вопр. Агротех. Селек. Сахар. Свёклы. [*Probl. Agr. Sel. Sug. Beet*], *1955*, pp. 160–161, 1955. [Abs. in *Referat. Zh. Biol.* 6, p. 204, 1957.]

Studies in the U.S.S.R. showed that sugar beets infected by *Sclerotium bataticola* [*Macrophomina phaseoli*: cf. 18, p. 286] do not keep in storage as well as healthy ones, 50 per cent. being killed. Seed yields are usually reduced by 23 to 35 per cent. A careful rejection of infected beets is recommended during harvesting.

Dekker (J.). **Ontsmetting van Bietezaad met antibiotica.** [Disinfection of Beet seed with antibiotics.]—Abs. in *Tijdschr. PlZiekt.*, 63, 1, p. 25, 1957.

Although a considerable reduction in the incidence of the damping-off of beet seedlings caused by *Phoma betae* in the Netherlands may be achieved by dusting the glomerules with panogen [cf. 34, p. 692], it appears from statistics supplied by the State Seed Testing Station that even after treatment there may be a residue of 10 to 20 per cent. infection or more. Tests were therefore made with rimocidin and 'antibiotic P' [pimaricine] (produced by the Royal Dutch Yeast and Spirit Factory), both of which had been shown to combine capacity for deep seed penetration with fungicidal properties and negligible phytotoxicity. Seed of the years 1954 and 1955 with 60 to 80 per cent. infection by *P. betae* was used, the glomerules being spread out on damp filter paper and the numbers of pycnidia counted after 12 days.

By 24 hours' immersion in a solution of pimaricine (100 p.p.m.) the percentage of infection was reduced to 1 compared with 11 for panogen. In further tests both pimaricine and rimocidin were used in a 50 per cent. methanol suspension with satisfactory results. The rapid evaporation of the spirit after application is an advantage over the dry treatment. In another test 30 ml. of a 2 per cent. suspension of pimaricine or 60 ml. of a 1 per cent. per kg. seed reduced damping-off from 70 to 0·4 per cent.

Buxton (E. W.). **Some effects of Pea root exudates on physiologic races of Fusarium oxysporum Fr. f. pisi (Linf.) Snyder & Hansen.**—*Trans. Brit. mycol. Soc.*, 40, 1, pp. 145–154, 11 graphs, 1957.

In further studies at Rothamsted Experimental Station on pea wilt [36, p. 45] investigations were made on the effects on three physiologic races of *Fusarium oxysporum* f. *pisi* of root exudates from the pea cultivars Onward, susceptible to all three, Alaska, resistant to 1 but susceptible to 2 and 3, and Delwiche Commando, resistant to 1 and 2 but susceptible to 3 [35, p. 411]. The exudates were obtained from pea roots grown under sterile conditions by concentrating (to one-fifth of its original volume) under a vacuum the water used in (*a*) germinating one pea in 10 ml. sterile, distilled water; (*b*) three peas in 200 gm. sterile quartz sand and 100 ml. water; or (*c*) three peas in each of six sand columns through which 100 ml. water was circulated, as in Audus' soil perfusion apparatus (*Nature, Lond.*, 158, p. 419, 1946).

Exudates depressed the spore germination of races resisted by the source plant more than of those to which it was susceptible. The activity of exudates from young seedlings was greater than from older plants, a temporary increase occurring as side roots formed. There was no differential effect on germ tube or mycelial growth of the three races. Root exudates in porcelain cylinders on agar sown with spores caused concentric zones of differential growth, inhibiting spore germination when the source cultivar was resistant to the race cultured and being stimulatory when it was susceptible.

Root penetration of cultivars by races to which they were resistant was confined to the outer cortex. Extracts made from the bases of pea plants infected by *F. solani* inhibited spore germination of *F.o.* f. *pisi* [35, p. 411] whereas extracts from healthy plants did not.

Porter (F. M.), Smale (B. C.), Preston (W. H.), & Mitchell (J. W). **Suppression by two substituted carbamates of symptoms induced by southern Bean mosaic virus.**—*Phytopathology*, 47, 3, pp. 179–181, 1957.

Investigations at Beltsville, Maryland, using the stem scarification technique to inoculate Pinto beans [*Phaseolus vulgaris*] with southern bean mosaic virus [36, p. 295], showed that of 529 compounds tested, certain substituted carbamates applied to freshly inoculated areas suppressed the appearance of virus symptoms. Both furfuryl 5-chloro-2-methylcarbanilate (4067) and furfuryl carbanilate in lanoline almost entirely suppressed symptoms without apparent injury to the plant.

By using a carrier system with a volatile and a nonvolatile component, namely acetone and lanoline, it was possible to apply 4067 to bean stems before inoculation, the acetone dispersing the lanoline which might interfere with inoculation. This resulted in complete suppression of symptoms, with only slight localized injury to the stem.

Conover (R. A.). **Control of pole Bean rust with maneb-sulphur dust.**—*Proc. Fla hort. Soc.*, 69 (*1956*), pp. 247–250, 1957.

Experiments conducted at the Sub-Tropical Experiment Station, Homestead, Florida, indicated that improved control of rust (*Uromyces phaseoli* [f.] *typica*) [*U. appendiculatus*: cf. 32, p. 415; 35, pp. 807, 877, *et passim*] of pole beans [*Phaseolus ?vulgaris*] was obtained when maneb was added to sulphur dusts. Under commercial conditions 3·5 per cent. may perhaps prove adequate, if a whole field is dusted and no rust develops in the vicinity. Should this prove to be so, the cost per acre would about equal that for controlling fungal diseases of tomatoes. For the present, the writer suggests that growers should use dusts containing 5 per cent. maneb, which should prove most profitable when sulphur alone fails to give adequate control. When infection is severe applications should be made twice weekly before the beans start setting, and every five days after. Spraying with maneb two or three times before the fields are staked is a valuable adjunct to the dusting programme.

Hyre (R. A.). **Forecasting downy mildew of Lima Bean.**—*Plant Dis. Reptr*, 41, 1, pp. 7–9, 1 diag., 1957.

At the Horticultural Crops Research Branch, Newark, Delaware, a method developed for forecasting downy mildew (*Phytophthora phaseoli*) outbreaks on Lima bean [*Phaseolus lunatus*: 34, p. 124] from temperature and rainfall data also forms a basis for predicting late blight [*Phytophthora infestans*] on potato [33, p. 752]. A day is considered favourable for infection by *P. phaseoli* when a five-day moving mean temperature, ending on that day, is less than 79° F., with a minimum of 45° or above, and when there has been a 10-day total rainfall, also ending on that day, of 1·2 in. or more. The initial appearance of the disease is expected after about eight consecutive favourable days if there is a prospect of favourable weather continuing.

Berry (S. Z.) & Davis (G. N.). **Formation of oospores by Peronospora destructor and their possible relation to epiphytology.**—*Plant Dis. Reptr*, 41, 1, pp. 3–6, 3 figs., 1957.

In studies over a three-year period at the University of California, Davis, oospores of *Peronospora destructor* [cf. 36, p. 508] were observed on onion only in April and May in the greenhouse at 55° to 75° F. They occurred in the foliage and seed stalks of both highly resistant and susceptible varieties, and on plants bearing asexual spores as well as those without them [cf. 6, p. 139]. At no time were they found in infected plants in the field.

The possibility that oospores serve as primary inoculum in spring was studied by incubating water-sprayed leaves from the field for four hours and then treating

celloidin strippings from the leaf surface [cf. 34, p. 428] with 0·05 per cent. lactophenol. Soil particles round three oospores grouped together in one area indicated that the oospores had overwintered in the soil and had blown or splashed onto the leaf. Two had produced germ tubes.

These observations may explain the frequent occurrence of *P. destructor* on onion in California when primary infection by systemically infected bulbs is prevented.

Cox (R. S.). **Control of diseases in the Celery seedbed.**—*Proc. Fla hort. Soc.*, 69 (*1956*), pp. 242–244, 1957.

Investigations at Everlades Experiment Station, Belle Glade, Florida, showed that methyl bromide and chloropicrin were outstanding as soil fumigants for the control of the common root diseases in celery seed-beds locally, including 'red root', with which *Fusarium* sp., *Pythium* sp., and *Rhizoctonia* [*Corticium*] *solani* [33, p. 469] may be associated. Common leaf diseases in the Everglades area include a late damping-off (*Rhizoctonia*) [*C. solani*: loc. cit.], early blight (*Cercospora apii*) [34, p. 581], and late blight (*Septoria apii*) [cf. 35, p. 505], while bacterial blight (*Pseudomonas apii*) [35, p. 412] and a leaf spot tentatively identified as anthracnose (*Colletotrichum* sp.) have also been observed.

Exhaustive field trials demonstrated that control of all these leaf diseases was given by a mixture of spergon (4 in 100), zineb (2 in 100), and agricultural streptomycin (25 to 50 p.p.m.); or a mixture of neutral copper (4 in 100), zineb (2 in 100), and streptomycin (25 to 50 p.p.m.). These mixtures are slightly incompatible and cause some injury if used before 15th September. Thylate [36, p. 559] may be substituted for spergon or the neutral coppers. It is compatible with zineb, cheaper than spergon or copper, and has given excellent control of damping-off and early blight. A mixture of thylate and zineb gave better control of anthracnose than either material alone. In a preliminary field test a new material, B-622 (kemate or dyrene), gave promising control of early blight.

Celery beds (4 by 300 ft.) should be fumigated before seeding with methyl bromide (12 to 24 lb. per bed) or chloropicrin (1 to 2 gals.). Spraying should be done every five days to three times a week during the rainy season, and once a week later on.

Geraldson (C. M.). **Evaluation of control methods for blackheart of Celery and blossom-end rot of Tomatoes.**—*Proc. Fla hort. Soc.*, 69 (*1956*), pp. 236–241, 2 figs., 1957.

Liquid culture experiments conducted at the Gulf Coast Experiment Station, Bradenton, Florida, showed that excessive soluble ammonium, potassium, magnesium, or sodium salts or a deficiency of soluble calcium salts (low calcium ratio) caused a reduced calcium uptake and increased the incidence of the physiological disorders, blackheart of Pascal celery [34, p. 73] and blossom-end rot of STEP 250 tomato [35, p. 795]. Calcium deficiency can also be caused by excess total salts which is often associated with the prevalence of these disorders, even when the measurable calcium ratio appears to be high. Boron deficiency is also accentuated by high calcium ratios. Control is most effective if soil calcium is supplemented by calcium sprays.

Marlatt (R. B.), Stewart (J. L.), & Berkenkamp (B. B.). **Storage of Lettuce with rib discoloration.**—*Phytopathology*, 47, 4, pp. 231–232, 1957.

Three years' observations at the University of Arizona Agricultural Experiment Station, Mesa, on lettuce initially affected by rib discoloration (rib blight) [34, p. 569; 35, p. 264] and stored at 37°, 47°, and 50° F. showed that the lesions darkened and turned black at all temperatures after six days, but did not increase appreciably in size during 25 days' storage, nor did any new lesions appear after eight days at

47°. Affected lettuce was more prone to [unspecified] bacterial decay and to the condition known as pink rib [36, p. 371].

Brants (D. H.). **Sclerotinia minor (Jagger) op Sla.** [*Sclerotinia minor* (Jagger) on Lettuce.]—Abs. in *Tijdschr. PlZiekt.*, 63, 1, pp. 22–23, 1957.

It was conclusively demonstrated in the Netherlands that only wounded lettuce plants are susceptible to infection by *Sclerotinia minor*, the intact epidermis forming an impenetrable barrier. Formalin, in comparison with thiram, brassicol, and mercuric chloride, was the most effective for destroying the sclerotia [cf. 19, p. 512]. Germination was also inhibited by $1\frac{1}{4}$ hours at 70° C. Steam sterilization of the soil [35, p. 505] is reported to give good results in practice.

Hilborn (M. T.), Hepler (P. R.), & Cooper (G. F.). **Effect of polyethylene mulch on soil-borne pathogens of Lettuce.**—Abs. in *Phytopathology*, 47, 4, p. 245, 1957.

Prevalent soil-borne diseases of lettuce in Maine, including bottom rot (*Rhizoctonia* sp.) [cf. 33, p. 618], drop (*Sclerotinia* sp.) [cf. 33, p. 233], and slime rot (chiefly *Pseudomonas* sp.) [cf. 35, p. 859] are apparently uncontrollable by fungicides. In 1956 black and white polyethylene mulches, laid in strips 36- to 48-in. wide to keep the heads out of contact with the soil, reduced slime rot from 52·7 per cent. in the unmulched to 16·3 with the white mulch and 18·2 per cent. with the black.

Sowell (G.). **Cucumber fungicides for the west coast of Florida.**—*Proc. Fla hort. Soc.*, 69 (*1956*), pp. 230–234, 1957.

In tests conducted in 1955–6 at the Gulf Coast Experiment Station, Bradenton, Florida, with various fungicides used for the control of cucumber diseases soil rot, associated locally with *Rhizoctonia* [*Corticium*] *solani* [cf. 30, p. 504], was significantly reduced by captan (3 lb. of 50 per cent. per acre) applied as a single concentrated spray when the plants were young or when the disease appeared, or applied weekly (2 lb. active per 100 gals. water) alternately with nabam plus zinc sulphate.

Maneb plus zinc sulphate gave the best control of downy mildew (*Pseudoperonospora cubensis*), with the highest yield of marketable cucumbers. The neutral copper fungicides had little effect and should not be used against this disease. Maneb controlled a moderate infection of powdery mildew (*Erysiphe cichoracearum*) in the field.

Greenhouse screening tests showed that while griseofulvin (spray at 500 p.p.m. and 1 per cent. dust) significantly reduced powdery mildew it did not compare in effectiveness with the synthetic materials. Karathane and ovex (*p*-chlorophenyl *p*-chlorobenzene sulphonate) were outstandingly successful. Ovex merits further test.

Conover (R. A.). **Phytotoxicity of fungicides to Cantaloupes.**—*Proc. Fla hort. Soc.*, 69 (*1956*), pp. 198–200, 1957.

A spraying test carried out at the Sub-Tropical Experiment Station, Homestead, Florida in spring, 1956, to determine whether the fungicides commonly used locally to control downy mildew (*Pseudoperonospora cubensis*) and powdery mildew (*Erysiphe cichoracearum*) of cantaloupe melons [cf. 32, p. 169; 34, p. 660; 35, p. 72, *et passim*] were phytotoxic demonstrated that carbamates may cause injury (premature defoliation), with deleterious effects on the yield and size of the melons. Wide differences in toxicity were shown by fungicides known to control *P. cubensis*. The evidence indicated that zineb is the safest of those recommended for downy mildew control [cf. 34, p. 581]. Karathane, used against powdery mildew [cf. 33, p. 656], appears to be safe for use on cantaloupe.

These results, obtained in Dade County, do not necessarily apply to other parts of Florida.

Overman (A. J.) & Burgis (D. S.). **Fungicidal, herbicidal and nematocidal effects of fumigants applied to vegetable seedbeds on sandy soil.**—*Proc. Fla hort. Soc.*, 69 (*1956*), pp. 250–255, 1957.

In work at the Gulf Coast Experiment Station, Bradenton, Florida, two series of soil fumigation treatments were carried out. Series A, requiring 10 to 14 days between treating and sowing, included crag mylone (3,5-dimethyl tetrahydro-1,3,5-2H-thiadiazine-2-thione) [35, p. 31], vapam [loc. cit.], and a mixture of nemagon (1,2-dibromo-3-chloropropane) and allyl alcohol. Series B, requiring five to seven days between treatment and sowing, included allyl alcohol alone and plus D-D. Shell AC 4101 was used as emulsifier. All chemicals were applied as drenches in 1½ gal. water per 12 sq. ft. bed. The crops were Yolo Wonder [chilli] pepper and Florida Market (Cook's strain) eggplant, both requiring a long time in the seed-bed, Copenhagen Market cabbage, sensitive to copper, and Grothen's Globe tomato.

All the materials decreased [unspecified] damping-off; plots treated with crag mylone and allyl alcohol had no post-emergence failures. Colony counts of *Fusarium* spp. were chosen as a representative basis for comparison of the different treatments, samples being taken weekly for seven weeks. The averages of these counts, expressed as colonies per gm. dry soil $\times 10^{-3}$, were: group A, control (water only) 28·6, nemagon plus allyl alcohol 6·9, crag mylone 8·5, vapam 11·7; group B, control 11·7, allyl alcohol alone 2·7, plus D-D 3·3.

It is concluded that the addition of nemagon or D-D to the allyl alcohol drench gave a soil treatment which was effective as a fungicide, a nematocide, and a herbicide. Vapam and crag mylone were also effective in all three categories.

Dunleavy (J. M.). **Soybean diseases in Iowa in 1955.**—*Soybean Dig.*, 16, 9, p. 20, 1 fig., 1 graph, 1956.

A survey of soy-bean diseases in Iowa in 1955 [cf. 35, p. 66] revealed that 95 per cent. of the fields were infected by root rot (*Fusarium* sp.) [loc. cit.], 65 per cent. by pod and stem blight [*Diaporthe phaseolorum* var. *sojae*: 34, p. 126; cf. 36, p. 229], 28 per cent. by bacterial blight [*Pseudomonas glycinea*: 35, p. 66], and 23 per cent. by brown stem rot [*Cephalosporium gregatum*: loc. cit.]. Bacterial pustule [*Xanthomonas phaseoli* var. *sojense*: loc. cit.] was widespread in southern Iowa, the percentage of pustules per leaf ranging from one to six and leaf infection from 10 to 30 per cent. Downy mildew [*Peronospora manshurica*: 33, p. 525] was observed in northern Iowa on the Blackhawk variety.

Clinton (P. K. S.). **A note on a wilt of Groundnuts due to Sclerotium rolfsii Sacc., in Tanganyika.**—*E. Afr. agric. J.*, 22, 3, pp. 137–141, 1957.

At the Experiment Stations of the Overseas Food Corporation, Urambo, Western Province, and Namanga, Southern Province, a wilt, accompanied by a browning of the foliage, of Natal Common groundnuts occurred in February, 1950, in poorly drained areas after a wet period, and was associated with *Sclerotium rolfsii* on the roots. In April premature wilting and death of the haulms occurred in short sections of the rows. Attachment of the pods was weakened and many were lost during harvesting. The wilt was again seen in many parts of the Southern Province in 1951, especially in areas subject to waterlogging; in some cases *S. rolfsii* was associated with a bacterium, which was not identified.

Laboratory investigations on the fungus are described in detail. Exposure of the sclerotia to 55° C. for periods of ten minutes had no adverse effect upon germination, but ten minutes at 60° or one minute at 65° heavily reduced it; prolonged exposure at 43° was lethal. The fungus tolerated a wide range of acidity in culture.

The available evidence indicates that once established in a soil the fungus will increase annually with continuous cropping. Infections are found to a depth of 10 in., but ploughing to a depth of 8 in. gave complete control, which may indicate

that very few sclerotia are present below this level, and there may be only a very narrow horizon in which they are not adversely affected by some factor or factors; thus the potentiality of infection during the dry season is reduced. Sowing seed in the shell, which may carry infection, and leaving large quantities of débris on the ground are undesirable.

CIFERRI (R.). **Frequenza media della Peronospora primaverile.** [Average frequency of spring *Peronospora*.]—*Progr. agric., Bologna*, 2, 10, pp. 934–937, 1 fig., 2 maps (1 col.), 1956.

This is a concise summary of studies at the Botanical Institute of the University of Pavia from 1947 to 1956 on the distribution of *Peronospora* [*Plasmopara viticola*: cf. 36, p. 302] on vine in Italy. Maps show the intensity of vine cultivation and the percentage disease incidence. It is concluded that there is no correlation between the occurrence of *P. viticola* and meteorological conditions.

PIOTH (LUISE C.). **Untersuchungen über anatomische und physiologische Eigenschaften resistenter und anfälliger Reben in Beziehung zur Entwicklung von Plasmopara viticola.** [Studies on anatomical and physiological characters of resistant and susceptible Vines in relation to the development of *Plasmopara viticola*.]—*Z. Pflanzenz.*, 37, 2, pp. 127–158, 8 figs., 1 graph, 1957.

The growth rate of American wild vines and hybrids resistant to *Plasmopara viticola* [36, p. 571] was appreciably more rapid than that of the susceptible European varieties in the author's comprehensive studies at the Viticultural Institute, Geilweilerhof, Germany. At the beginning the leaves of the resistant forms contain fewer mucilage cells than the highly susceptible, but as the growth rate of the former declines the numbers increase until eventually there is no difference between the two groups. Susceptibility increases *pari passu* with a rise in the number of mucilage cells. Deviations from this relationship occur in the leaves of the immune *Ampelopsis brevipedunculata* and *Parthenocissus quinquefolia*, in which the cells are numerous at all times.

An indole compound, shown by the *Avena* test to be a growth substance, was initially demonstrable in highly susceptible vines, but did not appear in the resistant until the growth rate declined and susceptibility was simultaneously enhanced. Immune varieties supplied with indole acetic or indole butyric acid became susceptible (grade 2 to 3 on a scale 0 to 5), whereas the ratings of semi-resistant and highly susceptible types were reduced.

A modification of the staining method of Goldwait *et al.* (*Text. Res. J.*, 20, pp. 100–104, 1950), involving the use of chlorantin light green BLL (Ciba Company) of various concentrations (87,630 being the best), was employed for examining the fungus in the host. The dimensions thus obtained differed, in part considerably, from those reported in the literature. Thus, the sporangia ranged from 6·2 to 32·8 by 5·3 to 15·4 (mean 10·4 by 9·5) μ; the oospores from 7 to 29·4 by 5·3 to 19 (20·4 by 14) μ; the haustoria from 2·5 to 10·4 (5·9 to 7) μ long; and the mycelium from 1·5 to 15·7 (7) μ in diameter. Near the mucilage cells and vascular bundles the fungus is present in abundance, extending haustoria into the normal and mucilage cells and the vascular bundle sheath.

Contrary to the published descriptions, the oospores were oval and smooth. They were never found in outdoor vines and only once in greenhouse material during a $2\frac{1}{2}$-year period, so that their occurrence is by no means so frequent as hitherto assumed. Overwintering mycelium was detected in dormant wood and buds, the latter also carrying sporangiophores.

P. viticola could be induced to grow *in vitro* only when points of attachment similar to stomata were supplied in the form of fragments of a spongy synthetic material known as 'iporka', and asparagine, aneurin [vitamin B_1], indole-acetic

acid, and oxalic acid, preferably supplemented by malic, tartaric, and citric acids, were added to the mineral salts medium. Further difficulties were overcome by the adoption of Sörgel's method (*Züchter*, 21, p. 322, 1951), in which a small Petri dish containing the nutrient solution and covered with filter paper was placed inside a larger closed one. Under these conditions conidiophores developed but not oospores. There is a bibliography of 188 titles.

Levitsky (G. D.). Новые фунгисиды в борьбе против мильдью Винограда. [New fungicides in the control of Vine mildew.]—*Vinogradarstvo*, 4, pp. 39–40, 1956. [Abs. in *Referat. Zh. Biol.* 6, p. 206, 1957.]

Experiments carried out in the U.S.S.R. on the control of vine [downy] mildew [*Plasmopara viticola*: 35, p. 907] showed that 1 and 2 per cent. fuclasin was as effective as Bordeaux mixture [cf. 35, p. 864; 36, p. 570]. Its advantages are that it is simple to prepare and it does not injure the leaf. Dinitrorhodanebenzene [nirit: cf. 36, p. 329] (1 and 1·5 per cent.) was also effective, though less so than fuclasin, and did not cause scorch.

Boubals (D.), Vergnes (A.), & Lelakis (P.). **Essais de fongicides organiques dans la lutte contre l'oidium de la Vigne effectués en 1955.** [Tests with organic fungicides in the control of *Oidium* of the Vine carried out in 1955.]—*Progr. agric. vitic.*, 145, 14–15, pp. 202–206; 16–17, pp. 216–222, 1956.

At the National School of Agriculture, Montpellier, France, captan at 0·25 per cent., zineb at 0·6 per cent., and 2 per cent. Bordeaux mixture used for the control of vine downy mildew (*Plasmopara viticola*) [36, p. 165] were applied alone and with karathane, product CS (a highly refined liquid isoparaffin), and flowers of sulphur to control *Uncinula necator* [35, p. 270]. Karathane was less effective against *U. necator* than sulphur, CS was ineffective, and copper, captan, and zineb made no difference.

Boubals (D.), Agulhon (R.), & Vergnes (A.). **Essais de lutte contre l'excoriose (Phoma flaccida Viala et Ravaz).** [Control trials against excoriosis (*Phoma flaccida* Viala and Ravaz).]—*Progr. agric. vitic.*, 145, 10–11, pp. 152–157; 12–13, pp. 169–173, 1956.

In field and laboratory trials in the Gard Department, France, in 1955, the pycnidia of vine excoriosis (*Phoma flaccida*) [19, p. 193] were entirely destroyed by applications on 10th February and 10th March of sodium arsenite [cf. 28, p. 376] in 0·5 to 5 per cent. solution. No phytotoxicity to dormant buds was observed. Destruction of pycnidia does not, however, mean total control, as mycelium remains in the buds.

Bos (L.). **Heksenbezemverschijnselen, een pathologisch-morfologisch onderzoek.** [Witches' broom symptoms, a pathological-morphological study.]—*Belmontia*, 4 (incidental), 1, pp. 1–79, 4 pl., 19 figs. (3 col.), 1957. [English summary.]

In this important, fully documented study the author describes in detail the symptoms of witches' broom virus observed during the first half of 1950 at the General Experiment Station for Agriculture, Bogor, Java, on *Crotalaria juncea* [cf. 35, p. 92] and *C. usaramoensis*, groundnut [34, p. 340], *Phaseolus calcaratus*, *P. lunatus*, *P. radiatus*, and cowpea. All hosts reacted similarly to the virus. In addition to the symptoms already described [31, p. 165] there was much phyllody. For the whole series of floral changes from greening to complete transformation into a vegetative branch the author uses the term antholysis. The disease is compared with *Rubus* stunt virus on raspberry and blackberry [35, p. 374] and witches' broom of *Tropaeolum majus* [see below, p. 648] in the Netherlands. Other aspects of the problem covered by the investigations are the occurrence of

antholysis independently of witches' broom; citations from the literature concerning witches' broom on various hosts, with special reference to Indonesia and the Netherlands, supplemented by a bibliography of 262 titles; morphological considerations which includes a discussion on the origin of the flower; and pathological observations.

Tabular surveys are included of (1) the occurrence of 'curl disease' in tropical crops in Indonesia according to *Meded.Inst.PlZiekt., Buitenz.*, 1914 to 1932; and (2) all the witches' broom virus diseases and viruses mentioned in the literature, with particulars of their nature, history, author and date of first establishment of diagnosis, synonymy, geographical distribution, hosts, insect vectors, transmission by *Cuscuta* spp., incubation period, and response to heat therapy.

[Also published in *Meded.LandbHogesch. Wageningen*, 57, 1, pp. 1–79, 1957.]

Plant quarantine announcements. Costa Rica.—*F.A.O. Pl. Prot. Bull.*, 5, 6, pp. 97–99, 1957.

By Decree No. 31 of the Ministry of Agriculture and Commerce of 25th October, 1956 (*Diario oficial*, 78, 257, 13th November, 1956), the importation into Costa Rica of citrus fruits from various regions [which are listed] is prohibited, to prevent the introduction of *Xanthomonas citri* [map 11]. The importation of any parts of *Saccharum* is also prohibited. Potatoes may be imported from countries other than those where *Heterodera rostochiensis* and *Synchytrium endobioticum* [map 1] are present, if accompanied by a phytosanitary certificate. The importation of any parts of any species or varieties of *Theobroma* or *Coffea*, or of citrus trees from a number of territories [listed], is prohibited. Seeds, fruit trees, ornamentals, forest trees, and propagating material in general, not otherwise specified, are permitted under phytosanitary certification.

Plant quarantine announcements.—*F.A.O. Pl. Prot. Bull.*, 5, 7, pp. 113–115, 1957.

Part II of Quarantine (Plants) Regulations (Regulation No. 37, of 1956), of 18th October, 1956, Territory of Papua and New Guinea, states that plants destined for importation must be accompanied by a phytosanitary certificate and are subject to inspection.

Thailand Plant Diseases and Plant Pests Quarantine Act, B.E. 2495, which came into effect on 10th June, 1956, empowers prohibition of the importation of plants and the designation of quarantine areas. Ministerial Regulation (B.E. 2499) of 3rd June, 1956, prohibits the importation of planting material of rice, rubber, sugarcane, and coffee.

U.S. Trust Territory of the Pacific Islands Executive Order No. 58 of 5th June, 1956, amends Executive Order No. 23 of 4th March, 1952, and thereunder Quarantine Nos. 1–9 and Plant and Animal Quarantine Regulations Nos. 1–5 were approved on 6th September, 1956, and issued. All previous legislation on plant and animal quarantine is superseded and provisions governing the importation of plants and insects into the Territory are specified.

Polen. Ein- und Ausfuhr von Pflanzen. Verordnung Nr. 63 des Landwirtschaftsministers vom 10. Januar 1955. [Poland. Import and export of plants. Order No. 63 of the Minister of Agriculture of 10th January, 1955.]—*Amtl. PflSch-Bestimm.*, N.F., 10, 1, pp. 55–60, 1957.

Under the terms of the above-mentioned Order consignments of potatoes imported into Poland must be accompanied by a duly authenticated certificate vouching for their origin in areas at least 10 km. distant from foci of wart disease [*Synchytrium endobioticum*: cf. 13, p. 207]. An identical provision applies to small deciduous trees and bushes and layers of the same, and to bulbs, rhizomes, or other underground organs of ornamentals or vegetables. A list is given of virus, bacterial, and fungal diseases which necessitate restrictions on traffic in plants.

Schweiz. Einfuhr und Transport von Saatkartoffeln. Mitteilung der Eidg. Oberzolldirektion, der Abteilung für Landwirtschaft des Eidg. Volkswirtschaftsdepartementes und der Eidg. Alkoholverwaltung vom 14. September 1956. [Switzerland. Import and transport of seed Potatoes. Notification of the Federal Director-General of Customs, of the Section for Agriculture of the Federal Department of Political Economy, and of the Federal Alcohol Administration of 14th September, 1956.]—*Amtl. PflSchBestimm.*, N.F., 10, 1, pp. 60–64, 1957.

This Notification prescribes that consignments of potatoes imported into Switzerland shall be accompanied by a properly attested certificate guaranteeing their freedom from wart disease [*Synchytrium endobioticum*: 36, p. 5] and the absence of the fungus from the site of cultivation and from a radius of at least 5 km.

Åkerberg (E.). **Årsberättelse över Sveriges Utsädesforenings verksamhet år 1956.** [Annual report on the work of the Swedish Seed Association for the year 1956.] —*Sverig. Utsädesfören. Tidskr.*, 67, 2–3, pp. 69–177, 3 graphs, 1957.

At the headquarters (Svalöf) and branches of the Swedish Seed Association during 1956 [cf. 35, p. 660] three potato selections produced, Sv 50082 (Sandnudel ×Elsa), Sv 51076, and Sv 52106 (both derived from Bintje×Sv 39108), were found to be immune from wart disease [*Synchytrium endobioticum*], while 50082 in particular was also very resistant to blight [*Phytophthora infestans*].

Fusarium [*Calonectria nivalis*] and *Typhula* spp. [*T. borealis* and *T. itoana*: 35, pp. 192, 771] were responsible for heavy losses of the winter barley in the Kalmar district and rye crops in Övre-Norrland. *C. nivalis* was also highly pathogenic to winter wheat in Västernorrland.

Gagnotto (Anna V.). **Le malattie delle piante ornamentali osservate in Italia. Parte I. Pteridophyta e Gymnospermae.** [The diseases of ornamental plants observed in Italy. Part I. Pteridophyta and Gymnospermae.]

Fabricatore (Jolanda A.). **Dicotyledoneae. Parte prima.** [Dicotyledones. Part one.] —*Ann. Sper. agr.*, N.S., 11, 2, *Suppl.*, pp. I–XLII; pp. XLV–LXXVIII, 1957. [English summaries.]

These are bibliographical reviews (147 titles in the first and 295 in the second) listing the disorders of Pteridophyta, Gymnospermae, and 19 families of Dicotyledons attributable to fungi, bacteria, viruses, nematodes, and environmental factors, with reference also to teratological deformations in the first two groups. Notes are given on the morphology of the organisms, symptoms, and control. Under 'reports' are given pathogenic agents of which the incidence only is recorded. The dicotyledonous families Acanthaceae to Caryophyllaceae are covered.

Scaramuzzi (G.) & Tucci (S.). **Rassegna bibliografica delle principali malattie delle piante coltivate a tutt'oggi segnalate in Puglia.** [A bibliographical review of the principal diseases of cultivated plants hitherto reported in Apulia.]—*Ann. Sper. agr.*, N.S., 11, 2, *Suppl.*, pp. CXLIX–CC, 1957. [English summary.]

This is a chronological list of references to plant diseases in Apulia, Italy, arranged under the headings of woody, herbaceous, and ornamental and flowering plants, subdivided into parasitic and virus diseases, and non-parasitic or 'dysfunctional' disorders.

Annual report of the Cameroons Development Corporation, 1956.—33 pp., 6 pl., [1957].

In the section of this report [35, p. 905] dealing with agricultural activities (pp. 5–10) it is stated that during 1956 *Mycosphaerella musicola* reached serious

proportions on bananas in parts of the Cameroons, estates totalling 2,200 acres at Muyuka, Bimbia, and Mabeta almost ceasing production of marketable fruit. In December incidence increased throughout all the mature plantings in the southern areas and the adjoining French Cameroons. Of various spraying machines tested, the largest, 'the Giraffe', hauled by a caterpillar tractor, sprays from a tower 35 ft. high and can cover 10 acres per hr, but is operable only on fairly level ground. Knapsack power—misting machines gave some control, but the operators were unskilled. At the end of the year 1,000 acres were under spray control and additional machines were on order.

Measures to control cigar-end disease [*Trachysphaera fructigena* and *Verticillium theobromae*: 35, p. 906] were again necessary for six months of the year; the disease is spreading, but is under control. Panama disease [*Fusarium oxysporum* f. *cubense*: 35, p. 277], which has spread to all the Corporation's mature banana areas except Tombel, has recently been confirmed in adjacent French Cameroons at Mbanga.

Cacao production exceeded the estimate by nearly 19 tons, mainly as a result of systematic spraying against black pod [*Phytophthora palmivora*: 35, p. 278] and 'leafless twig' [cause not indicated], the latter being considerably reduced.

HUBERT (F. P.). **Diseases of some export crops in Indonesia.**—*Plant Dis. Reptr*, 41, 1, pp. 55–63, 7 figs., 1957.

Most of the information contained in the section of this paper dealing with *Hevea* rubber diseases in Indonesia has been noticed from other sources [31, p. 399; 35, p. 230]. Die-back (*Botryodiplodia theobromae*) [21, p. 323; cf. 34, p. 687] is widespread.

The worst disease of tea is blister blight (*Exobasidium vexans*) [35, p. 550] which has become widespread since 1949, but red 'rust' (*Cephaleuros parasitica*) [*C. mycoidea*: cf. 33, p. 263] is also serious, on both leaves and stems. Velvet blight (*Septobasidium* spp.) [cf. 27, p. 260] is sometimes severe enough to kill the plants. Pink disease (*Corticium salmonicolor*) [cf. 16, p. 280] is common and severe in Java and Sumatra.

Among diseases of cacao, a crop confined to north central Java, die-back (*Diplodia* [*B.*] *theobromae*) is one of the more important, the most destructive probably being black pod rot and canker (*Phytophthora palmivora*) [31, p. 9]. Black root rot (*Rosellinia arcuata*) and red rot (*Ganoderma pseudoferreum*) [map 98; cf. 33, p. 142] are also troublesome.

C. salmonicolor [35, p. 181] sometimes causes serious damage to coffee plantations under adverse growing conditions; root rots, particularly the brown-root disease caused by *Fomes lamaensis* [?*F. noxius*] are also highly destructive; but the most serious disease is probably leaf rust (*Hemileia vastatrix*) [30, p. 26].

Sugar-cane is infected by *Xanthomonas vasculorum* [map 3; 6, p. 378] in Java and Borneo and by *Cercospora kopkei* [31, p. 207] on the northern coast of central Java. The extent of red rot damage (*Physalospora* [*Glomerella*] *tucumanensis*) [map 186; 6, p. 378] may depend upon the amount of injury inflicted by borers [*Diatraea* spp.].

Bacterial wilt (*Pseudomonas solanacearum*) [30, p. 263] is widespread and destructive on tobacco; *Oidium tabaci* [*Erysiphe cichoracearum*: 19, p. 732] is highly destructive during seasons of excessive rainfall; black leg and hollow stock in Java is reported to be caused by *Erwinia aroideae* [18, p. 481].

Bud rot caused by *Phytophthora palmivora* [cf. 33, p. 152] is probably the most serious disease of coco-nut, particularly in Java, but leaf blight (*Pestalotia palmarum*) [16, p. 529] is occasionally destructive, especially in nurseries or on newly-planted trees.

'Yellow disease' of pepper (*Piper nigrum*), possibly due to a nematode-fungus complex, has destroyed some 20,000,000 trees on the island of Banka, off Sumatra. 'Slow decline' often affects clove trees [cf. 35, p. 164] in central Sumatra and

threatens the clove industry of central Java. Cultures of a *Phytophthora* sp. were obtained from the roots of infected trees. Foliage symptoms were often absent until the disease in the root system was well advanced.

Riddle (J. W.), Kabler (P. W.), Kenner (B. A.), Bordner (R. H.), Rockwood (Sue W.), & Stevenson (H. J. R.). **Bacterial identification by infrared spectrophotometry.**—*J. Bact.*, 72, 5, pp. 593–603, 6 graphs, 1956.

In the past the comparison of infra-red absorption spectra of micro-organisms has not been used for identification, because although obvious qualitative differences between species could be detected it was impossible to achieve standard results with different preparations of one organism. At the Microbiology Section, Robert A. Taft Sanitary Engineering Centre, Cincinnati, Ohio, by precise adjustments of the spectrophotometer and the use of sample films of controlled thickness, differences between the spectra of different samples of the same bacterial culture were virtually eliminated. Excellent reproducibility was achieved with different strains of the species, and also the spectra of many strains of certain species were either completely superimposible or very nearly so throughout the entire range from 5·8 μ to 12·1 μ: the loci of absorption bands were identical and the absorption curves identical or nearly so. However, the method is at present inadequate for distinguishing between certain strains and species.

A single punched card bears all the necessary data for one species, and a coding system permits the rapid sorting, examination, and comparison of spectra and associated data from a catalogue collection of standard spectra. Examination of 650 strains of 201 species, representing 33 bacterial genera, yielded 1,395 spectra of which 637, selected as standards, form the nucleus of the catalogue collection. Some [unspecified] yeasts were included in the study.

It is concluded that this method may be of value in the rapid identification of other micro-organisms and perhaps also in the study of biological materials.

Futrell (M. C.) & Atkins (I. M.). **Trends in diseases of cereal crops in Texas in recent years.**—*Plant Dis. Reptr*, 41, 1, pp. 42–46, 1 graph, 2 maps, 1957.

In southern Texas during 1954–5 and 1955–6 uredospores of *Puccinia rubigo-vera* var. *tritici* [*P. triticina*: 36, p. 235] and *P. graminis* were wind-borne from the northern and central areas of the State into the Texas Panhandle, autumn infections being moderate to heavy in irrigated fields, particularly near Amarillo and Hereford. The new races 17–29 and 48A [see next abstract] of *P. graminis* were highly destructive on Bowie wheat, yield being reduced on experimental plots at College Station from an average of 35 bush. per acre in 1953 to 9 in 1956. Stripe rust (*P. glumarum*) on experimental wheat plots at Prairie View in 1956 covered the largest infection area ever recorded in Texas. Spores of *P. coronata* and *P. graminis* were likewise wind-borne southwards to oats during autumn.

Other diseases included downy mildew (*Sclerophthora* [*Sclerospora*] *macrospora*) on wheat and oats [36, p. 95] near Iowa Park in 1955, and loose smut (*Ustilago tritici*) in several wheat fields, including some of the Concho variety. Oat smuts (*Ustilago* spp.) occurred in some central areas and [oat] red leaf virus [36, p. 238] was identified from plants collected in the south.

Blights caused by *Helminthosporium* [*Pyrenophora*] *teres* [35, p. 96] occurred in commercial barley fields in southern Texas in 1955 and 1956, and a disorder of flax, possibly due to a virus, was also observed.

Campos (A.) & Acosta (A.). **Wheat growing in Mexico.**—*Robigo, 1957*, 3, pp. 19–20, 1957. [Spanish translation.]

The Bureau of Special Studies, Mexico, D.F., reports that owing to race changes in stem rust (*Puccinia graminis*), which is the most important disease of the rapidly

expanding wheat crop in Mexico [34, p. 218], the following new varieties were introduced in 1953 and 1954 in replacement of previous ones: Chapingo 53, Gabo 54, Lerma Rojo, Mayo 54, Yaqui 53, Yaqui 54, and Yaktana 54. All are resistant or moderately so to races 29, 15B, and 48A [see preceding abstract], at present the most common, besides being resistant to previously prevalent races.

Nyquist (W. E.). **Inheritance of resistance to leaf rust in hybrids involving a common Wheat strain derived from Triticum timopheevi.**—*Agron. J.*, 49, 5, pp. 240–243, 1957.

In field plots at the University of California, Davis, in 1952 and 1953 crosses of C.I. 12633 wheat [36, p. 522], resistant to leaf rust (*Puccinia rubigo-vera tritici*) [*P. triticina*], with the susceptible Federation and White Federation showed that the mature plant resistance of C.I. 12633 to race 11 was controlled by one partially dominant major gene. In crosses with the susceptible Ramona control was by two partially dominant complementary major genes. Since only race 11 was found in the field it was concluded that the 9:7 ratio was due to intergenic interaction.

The fact that no susceptible plants came from crosses of C.I. 12633 with Chinese Spring (one of its resistant parents) suggested that the genes studied in the former probably did not come from *Triticum timopheevi* [loc. cit.] but from one of the resistant descendants of Chinese Spring, 2666A 2–2–15–6–3, but as susceptible plants were present in crosses with the latter it is concluded that the resistant genes of C.I. 12633 must have come from an earlier parent.

Kritzinger (A.). **The breeding of stem and leaf rust resistant varieties in South Africa.**—*Robigo*, *1957*, 3, p. 18, 1957. [Spanish translation.]

At the Elsenburg Agricultural College of the University of Stellenbosch, South Africa, *T*[*riticum*] *timopheevi* and *Agropyron elongatum* have been used for the past ten years as sources of resistance to wheat stem rust (*Puccinia graminis*) [34, p. 219] and several promising lines have been obtained. Wheat varieties such as Gabo, Timstein, Kenya 338, and (Mentana-Kenya) Supremo 1423–4c–3c–1c–1c–1c are resistant to all races of *P. graminis* isolated in South Africa.

Hoeser (K.). **Investigations on physiologic specialization of Puccinia graminis tritici in Germany and Austria.**—*Robigo*, *1957*, 3, pp. 8–9, 1957. [German and Spanish translations.]

In studies at the Bavarian Seed Production Station, Weihenstephan (Über Fraising), Germany, from 1952 to 1956, 33 races of *Puccinia graminis* on wheat [34, p. 217] were identified from 192 collections. Race 21 was the most frequent, followed by races 90 and 17. Races 32, 34, 40, 66a, and 144 were also frequent, and 11 and 15 slightly less so. Race 14, prevalent around 1930, is now rare.

Zogg (H.). **Über die Beeinflussung von Pathogenität und Wachstum eines pflanzlichen Parasiten durch die Vitamine B_1 und Biotin.** [On the influence of vitamins B_1 and biotin on the pathogenicity and growth of a plant parasite.]—*Schw. Z. allg. Path.*, 19, 5, pp. 501–503, 1956.

The results of one of the experiments performed at the Federal Agricultural Experiment Station, Zürich-Oerlikon, on the growth of *Calonectria graminicola* [*C. nivalis*] on a synthetic medium and on its pathogenicity to Huron summer and Probus winter wheat [see next abstract] are summarized: the rest are to be published *in extenso*.

Both vitamin B_1 and biotin were essential for the saprophytic growth of the fungus. Rising concentrations of biotin, within the range 5 to 50μg per l., caused a pronounced decline in pathogenicity when vitamin B_1 was almost or entirely

absent. When the latter was supplied at higher concentrations the decline was more gradual.

Zogg (H.). **Über die Beeinflussung von Pathogenität und Wachstum pflanzlicher Parasiten. I. Wirkung der Vorkultur auf verschiedene Fußkrankheitserreger bei Getreide.** [On the factors affecting pathogenicity and growth of plant parasites. I. Effect of previous culture on various foot rot agents of cereals.] *Phytopath. Z.*, 28, 4, pp. 423–426, 1957. [English summary.]

At the Federal Agricultural Experiment Station, Zürich-Oerlikon, cultures of *Hendersonia aberrans*, *Calonectria graminicola* [*C. nivalis*: see preceding abstract], *Ophiobolus herpotrichus*, and *Septoria tritici*, agents of cereal foot rot in Switzerland [31, p. 57], were tested for their pathogenicity to wheat after four to six years' growth on various media. Culture on 2 per cent. malt agar followed by nutrient solution for a short period resulted in a marked decrease of the disease, but full virulence was restored (except that of *S. tritici*) by transference to straw.

Tandon (I. N.) & Hansing (E. D.). **Control of loose smut of Barley by water-soak and anaerobic treatments.**—*Plant Dis. Reptr*, 41, 3, pp. 202–204, 1957.

At Kansas State College, Manhattan, trials over time and temperature ranges from 48 to 72 hrs. at 70° F. to 12 to 36 hrs. at 90° showed that loose smut (*Ustilago nuda*) of barley was completely controlled by both the anaerobic [cf. 36, p. 238] and water-soak [cf. 35, p. 177] treatments at 80° for 48 hrs. and 90° for 24, but seedling emergence after water-soaking was much lower. For the anaerobic treatment completely air-tight vessels are essential.

Šutić (D.). Ореална пегавост Овса. [Halo blight of Oats.]—Зборн. Радова пољопр. Фак., Београд (*Rev. Res. Fac. Agric., Beograd*), 4, 2, pp. 241–250, 4 figs., 1956. [English summary.]

Halo blight (*Pseudomonas coronafaciens*) of oats [cf. 36, p. 96] was recorded for the first time in Yugoslavia in 1953, when it caused serious losses in an oat-vetches fodder crop. The strain present was also pathogenic to *Bromus inermis* but not to barley, wheat, maize, *Lolium perenne*, or *Agropyron repens*, and only slightly so or not at all to rye and *Andropogon* spp.

Sowing only healthy seed and breeding resistant varieties are recommended for the control of the disease.

Luke (H. H.), Wallace (A. T.), & Chapman (W. H.). **A new disease symptom incited by the Oat leaf blotch pathogen, Helminthosporium avenae.**—*Plant Dis. Reptr*, 41, 2, pp. 109–110, 1 fig., 1957.

During a serious outbreak of *Helminthosporium* [*Pyrenophora*] *avenae* on oats [35, p. 519] in north-western Florida and southern Georgia in the spring of 1956, severe sheath and culm infections were observed for the first time. Leaf symptoms were unusual; large lesions coalesced into linear, reddish-pink or dark brown, necrotic blotches. Infection spread from the leaf base to the sheath and then into the culm, large black necrotic areas appearing, particularly near the nodes. Severe infection was occasionally followed by stem-break at the third or fourth internode. Seminole and Floriland generally appeared more resistant than other varieties grown, but were severely infected on land sown with oats in the previous year. Southland was particularly susceptible.

Szende (K.). **Physiological aspects of a rough form of Ustilago maydis.**—*Acta biol. Acad. Sci. hung.*, 6, 3–4, pp. 365–368, 3 figs., 1 graph, 1956.

At the Institute of Genetics, Budapest, a labile isolate of *Ustilago maydis* [23, p. 60], producing extremely rough colonies, arose from an originally smooth,

relatively constant strain after ultra-violet irradiation. The cells were grown in liquid culture supplemented by sodium-diethyldithiocarbamate, harvested after 48 hours, diluted to an appropriate concentration, and plated on sucrose-nutrient agar. A shift to rough from smooth then occurred. The sodium-diethyldithiocarbamate induced 'inversion growth' [cf. 36, p. 482], the inhibitory effect culminating at 10^{-5}–10^{-6} M; the maximum frequency of rough colonies was observed near the lethal concentration. Rough colonies reverted to smooth type resembling the original. The rough character was inherited in the progeny of crosses between rough and smooth strains.

Nelson (R. R.). **The genetics of compatibility in Cochliobolus heterostrophus.**—Abs. in *Phytopathology*, 47, 5, p. 313, 1957.

Backcrossing [at North Carolina State College, Raleigh: 36, p. 583] 436 ascospore isolates (from 39 conidial matings) to their conidial parents produced ascospores ranging in number from one to 112. Of the cultures derived from them 211 belonged to one compatibility group and 225 to the other. These and similar studies suggest that compatibility in *C. heterostrophus* is governed by one major gene.

Kulkarni (N. B.) & Patel (M. K.). **Study of the effect of nutrition and temperature on the size of spores in Piricularia setariae Nishikado.**—*Indian Phytopath.*, 9, 1, pp. 31–38, 1956.

At the College of Agriculture, Poona, India, the spore dimensions of *Piricularia setariae* from *Setaria italica* [34, p. 667] were larger on oatmeal, *S. italica* leaf decoction with dextrose, and *Eleusine coracana* leaf decoction agars than on host lesions; increases in length occurred on potato dextrose, *S. italica* leaf decoction without dextrose, and rice leaf decoction agars; and in length accompanied by significant decrease in width on Brown's agar and among secondary conidia. Length was reduced at 10° and 30° C. and increased at 15° to 25°.

Fisher (Francenia E.). **Control of anthracnose on rough Lemon seedlings.**—*Plant Dis. Reptr*, 41, 2, pp. 77–78, 1957.

In 1953–4 at the University of Florida Citrus Experiment Station, Lake Alfred, ferbam at 2½ lb. in 100 gals. water, applied every seven to ten days from late September to early December, gave the best control of anthracnose (*Colletotrichum gloeosporiodes*) [*Glomerella cingulata*] of rough lemon seedlings, the mean number of healthy leaves being 7·11 as against 5·76 for tribasic copper (50 per cent., 1 lb.), 4·88 for captan (2½ lb.) and 2·71 for the untreated. The largest plants were those treated with ferbam.

In 1956, when seedlings were sprayed five times from the end of July to early September, ferbam (1½ and 2 lb.) and zineb (1½) were more effective than captan (2) or copper sulphate (55 per cent., 2 lb.), the mean numbers of healthy leaves being 5·96, 6·75, 5·23, 3·17, and 4·17, respectively, and 2·64 on the control.

Ferbam also gave the best control of scab (*Elsinoe fawcetti*) [20, p. 460], though zineb was also effective.

Norman (P. A.) & Grant (T. J.). **Transmission of tristeza virus by aphids in Florida.**—*Proc. Fla hort. Soc.*, 69 (*1956*), pp. 38–42, 1957.

At the Entomology and the Horticultural Crops Research Branches, Orlando, Florida, tristeza virus [36, p. 317] was transmitted by *Aphis spiraecola* and *A. gossypii* [cf. 35, p. 888; 36, p. 400] from infected Valencia and Florida seedling sweet oranges and Temple orange to Key lime plants. *Toxoptera aurantii* [cf. 33, p. 535] was shown for the first time to be a vector. The virus transmitted directly from Meyer lemon by aphids produced much milder symptoms on Key lime than by tissue transfers.

Knorr (L. C.) & Price (W. C.). **Is stem pitting of Grapefruit a threat to the Florida grower?**—*Proc. Fla hort. Soc.*, 69 (*1956*), pp. 65–68, 1957.

Stem-pitting virus disease [cf. 35, pp. 3, 89, 354] and the seedling-yellows virus or virus complex [cf. 35, p. 587; 36, p. 317], both on grapefruit, do not occur in Florida, though tristeza virus [see preceding abstract] is not uncommon. The authors' hypothesis is that all three diseases, as well as lime die-back in Ghana [33, p. 151], are caused by a single virus with several strains.

Stem-pitting is considered to be a threat to Florida grapefruit growers, but not a very serious one as long as highly efficient vectors, such as *Aphis citricidus*, are kept out. If stem-pitting is caused by a virus distinct from that causing tristeza, measures, including the quarantining of all imported budwood, should be taken to prevent its entry into Florida.

Riley (E. A.). **Stem-pitting of Coffee.**—*Commonw. phytopath. News*, 3, 2, pp. 29–30, 2 figs., 1957.

In 1956 young *arabica* coffee trees which had carried a heavy crop at the Coffee Research Station, Moshi, Tanganyika, developed extensive die-back sometimes followed by death, the leaves remaining attached. The lower parts of affected stems were swollen, and peg-like protrusions of the inner bark fitted into deep pits and furrows in the wood cylinder. The condition was prevalent only in coffee plantings made since 1954. A similar disorder was observed in coffee in Kenya and in a wood sample from Brazil.

No fungi or bacteria were associated with affected plants and the occurrence of nuclear abnormalities indicates virus infection. Transmission experiments are in progress.

Costa (A. S.), Franco do Amaral (J.), Viégas (A. P.), Silva (D. M.), Teixeira (C. G.), & Pinheiro (E. D.). **Bacterial halo blight of Coffee in Brazil.**—*Phytopath. Z.*, 28, 4, pp. 427–444, 3 figs., 1957. [German summary.]

A bacterial disease of coffee, known as halo blight [36, p. 100], is jointly described from the Biological Institute, São Paulo, and the Agronomic Institute, Campinas, Brazil. It is prevalent chiefly in young plantings in areas exposed to strong winds, and was responsible for heavy losses during 1955–6. So far, only varieties of *Coffea arabica* have been found naturally infected.

The causal organism is a species of *Pseudomonas* closely resembling *P. tabacum* in pathogenicity but differing in physiological and cultural characters. Like *P. tabacum*, however, it secretes a toxin [35, p. 241] to which certain plants, e.g., bean (*Phaseolus vulgaris*), are highly sensitive.

In greenhouse inoculation tests with the pathogen positive results were obtained on *C. bukobensis*, *C. canephora*, *C. congensis*, *C. dewevrei*, *Chenopodium amaranticolor*, pigeon pea, *Canavalia ensiformis*, *Crotalaria juncea*, *C. paulinia*, *C. spectabilis*, *Dolichos lablab*, soy-bean, white lupin, bean, cowpea, tobacco, *Physalis floridana*, potato, cotton, and *Hibiscus esculentus*.

Halo blight symptoms were readily induced on greenhouse plants by injecting leaves with material from lesions or with bacterial suspensions, but spraying the latter on the leaves was mostly ineffectual except when the treated plants were placed in a moist chamber for 48 hours and blown with a fan for four periods of three hours to simulate wind action in causing friction between the leaves. Watersoaking of the leaves before inoculation also facilitated entry of the bacterium through the stomata [cf. 15, p. 537; 17, p. 205, *et passim*].

The pathogen was still viable in desiccated coffee leaves after 90 days, suggesting that diseased foliage overwintering on the tree is a primary source of infection for the new spring growth.

The results of a fertilizer experiment laid down in an area where the disease had

been prevalent indicated that susceptibility was enhanced by potassium and reduced by phosphorus, nitrogen being without effect.

Phytomycin (streptomycin) [35, p. 700] and agrimycin 100 [34, p. 529; 35, p. 380] were tested against halo blight. The former was very active *in vitro* but neither exerted any significant effect in the greenhouse or field. Of 15 commercial fungicides tested as sprays in the field, only two copper compounds conferred a slight degree of protection.

Willet (J. R.) & Bérczy (L.). **Penwortelziekte bij Koffie.** [Tap-root disease of Coffee.]—*Bergcultures*, 26, 6, pp. 115, 117–119, 2 figs., 1957. [English and Indonesian summaries.]

In 1955 one- to five-year-old coffee trees on the Tanah Merah estate, situated 500 to 800 m. above sea-level in East Java, were found standing loosely in the ground and they finally collapsed. The tap-roots were inversely flask-shaped, the uppermost (thick) part being without lateral roots. The results of laboratory and field investigations showed the cause of the trouble to lie in poor root growth resulting from a disturbed soil profile, contrasted with the active above-ground development made under otherwise favourable conditions and stimulated by liberal applications of nitrogenous manures. The root system of such trees is easily damaged, and during periods of high humidity root rot and secondary infections occur, e.g., by *Fomes lignosus* and species of *Rhizoctonia*, *Fusarium*, and *Diplodia*, causing a gradual decline. The disorder is preventable by making large planting holes (at least 60 by 60 by 60 cm.) and topping at a height of about 1 m., and may be cured by low stumping and intensive mulching under the trees.

Lutte chimique contre les principaux ennemis et les principales maladies du Caféier. [Chemical control of the principal pests and principal diseases of the Coffee tree.]—*Café, Cacao, Thé*, 1, 1, pp. 24–32, 8 figs., 1957.

This useful paper contains a series of suggestions, mainly from workers in French West and Equatorial Africa, for controlling the principal diseases and pests of coffee in the seed-bed, the nursery, and the field.

Arnold (M. H.). **Diseases.**—*Progr. Rep. Exp. Stas. Emp. Cott. Gr. Corp. (Tanganyika Territory, Lake Province), 1955–6*, pp. 13–18, 1957.

In 1955–6, the most striking feature of bacterial blight of cotton (*Xanthomonas malvacearum*) in Tanganyika Territory [35, p. 890] was the widespread occurrence of serious boll rot. Seed treatment appears to offer little protection against this phase of the disease (although in one trial, cotyledonary infection on seedlings from untreated seed 21 days after emergence was 94·3 per cent., whereas seed treatment with perecot reduced it to 13·5 per cent. and with agrosan to 5·2 per cent.), and complete control may depend on successful breeding for resistance. The local strain 4/53 was susceptible to stem inoculation, whereas about 60 per cent. of the plants of 8/290 possessed high resistance.

Verderevsky (D.) & Voitovich (K.). О методике выведения устойчивых к гоммозу сортов Хлопчатника. [On a method of producing Cotton varieties resistant to gummosis.]—Хлопководство [*Cotton Raising*], 7, 5, pp. 37–38, 1957.

In studies, begun in 1954, at the Moldavian Station of the Pan-Soviet Institute of Plant Protection, U.S.S.R., seeds of the commercial cotton varieties, 108–F, 611–B, and OD–1, and two prospective varieties, 3521–U and 6466–U, selections from Ukr. NiHi, were inoculated with a suspension of *Pseudomonas* [*Xanthomonas*] *malvacearum* [35, p. 891], using the vacuum infiltration method. All the infected plants (80 per cent.) were destroyed and the healthy ones reinoculated by applying the bacterial suspension with powdered glass to the lower leaf surfaces on stems of

young plants. Again the remaining healthy plants were repeatedly inoculated. Of the 19,000 plants of 108–F, 97,000 of 611–B, and 42,000 of OD–1 thus tested, 7, 17, and 212, respectively, were selected as immune.

In repeated inoculations the 1956 seed generation of the 1955 selection produced over 90 per cent. immune plants. Many of the first generation of selected plants did not differ morphologically from the original plants.

Ellingboe (A. H.), Kernkamp (M. F.), & Haws (B. A.). **Sweetclover Weevil parasitized by Beauveria bassiana (Bals.) Vuill. in Minnesota.**—*J. econ. Ent.*, 50, 2, pp. 173–174, 1 fig., 1 graph, 1957.

It was demonstrated conclusively by recent laboratory tests at Minnesota Agricultural Experiment Station that *Beauveria bassiana* [35, p. 618 *et passim*] infects and kills larvae of *Sitona cylindricollis*, which of late years has seriously curtailed sweet clover [*Melilotus* spp.] production in the State. The fungus also destroyed adult weevils, which were extensively parasitized and killed in the field in 1955. *B. bassiana* is readily propagated on potato dextrose agar at 23° to 25° C.

Hetagurova (Mme F. V.). Повреждения Льняного волокна микроорганизмами. [Damage to linen fibre by micro-organisms.]—Зборн. Раб. Инст. прикл. Зоол. Фитопат. [*Bull. Inst. appl. Zool. Phytopath.*] 4, pp. 216–224, 1956. [Abs. in *Referat. Zh. Biol.* 6, pp. 203–204, 1957.]

Among the micro-organisms chiefly responsible for damage to flax fibre in the U.S.S.R. [cf. 36, p. 187] are *Pseudomonas herbicola*, *P. fluorescens* [cf. 35, p. 609], and *Bacillus subtilis* [cf. 35, p. 35], which are present on flax throughout the growth period but become active only at the end of flowering and greatly damage the fibre during the retting processes.

Rojecka (Nadzieja). **Wystąpienie w Polsce szarej pleśni (Botrytis cinerea Pers.) na Kenafie (Hibiscus cannabinus).** [The appearance in Poland of grey mould (*Botrytis cinerea* Pers.) on Kenaf (*Hibiscus cannabinus*).]—*Roczn. Nauk rol.*, A 72, 1, pp. 145–246, 1955. [Abs. in *Referat. Zh. Biol.* 6, p. 204, 1957.]

Botrytis cinerea is reported on *Hibiscus cannabinus* [cf. 35, p. 357] in Poland, where it was first recorded in 1953 in a plantation of the Institute of Fodders and Plant Acclimatization.

Gupta (J. S.). **A new species of Protomycopsis on Sesbania aculeata Pers.**—*Indian Phytopath.*, 9, 1, pp. 72–73, 2 figs., 1956.

From Agra College, Agra, India, *Protomycopsis ajmeriensis* n.sp., causing leaf galls on *Sesbania aculeata*, is described. Chlamydospores are terminal, dark brown, and 21 to 24 μ in diameter, with a reticulate, areolate wall, 3 μ thick.

Magee (C. J.). **Outbreaks and new records. Republic of the Philippines.**—*F.A.O. Pl. Prot. Bull.*, 5, 7, p. 111, 1957.

In November, 1956, abaca (*Musa textilis*) at the Guinobatan Experiment Station, near the south-eastern end of Luzon, Philippine Islands, was affected by the chronic form of abaca bunchy top virus disease [34, p. 381].

Bernardo (F. A.) & Unali (D. L.). **Possible sources of resistance to Abaca mosaic and bunchy-top.**—*Philipp. Agric.*, 40, 5–6, pp. 277–284, 1956. [Received 1957.]

At the Central Experiment Station, Laguna, Philippines, pacol (*Musa balbisiana*), agotay (*M. banksii*), and *M. ornata* were completely resistant, canton (*M. textilis* × *M. balbisiana*) was highly resistant, and minay (*M. textilis* × *M. balbisiana*) and *Ensete glaucum* were moderately so to abaca [cucumber] mosaic virus [36, p. 320 and next abstract] transmitted from infected abaca (*M. textilis*) by *Aphis*

gossypii. Saguing maching (*M. banksii*) and red and white alinsanay (*M. textilis* × *M. banksii*) were highly susceptible.

Pacol was completely and canton highly resistant to [abaca] bunchy-top [virus] disease [33, p. 675] when inoculated by means of infective *Pentalonia nigronervosa*.

Cruz (E. E.), Otanes (F. Q.), Agati (J. A.), & Lanuzo (E.). **The campaign against Abaca mosaic disease in the Philippines.**—*Fibre Industr. Cord. World*, 39, 447, pp. 14, 16–18; 448, pp. 15, 17, 19, 1957.

This is an interesting survey of the history, objects, methods of organization, and progress to date of the campaign for the elimination of abaca [cucumber] mosaic virus from the plantations of *Musa textilis* in the Philippines [36, p. 321].

Celino (M. S.) & Martinez (A. L.). **Transmission of viruses from different plants to Abaca (Musa textilis Nee).**—*Philipp. Agric.*, 40, 5–6, pp. 285–302, 9 figs., 1956.

At the Central Experiment Station, Laguna, Philippines, viruses causing mosaic of *Rottboellia exaltata*, *Digitaria sanguinalis*, and *Panicum distachyum* were transmitted to abaca seedlings by means of *Aphis gossypii* and *A. maidis* [cf. 31, p. 119]. Symptoms were mild in contrast to those caused by abaca [cucumber] mosaic virus [see preceding abstract] and *Canna indica* mosaic virus [31, p. 119].

Abaca mosaic virus was transmitted from abaca to *Echinochloa colonum* and back to abaca without change of virulence; in Davao, where the virus is widespread, such transmissions probably occur in the field. The mosaic virus from *E. colonum* in non-abaca areas produced only mild symptoms on abaca.

The importance of checking grass growth is emphasized, mixed infection of abaca with abaca mosaic and grass mosaic viruses probably being far more destructive and difficult to control than a single-virus infection.

Inoculation of abaca with arrowroot mosaic virus resulted in leaf mottling, the leaves becoming dull green with uneven surface and wavy margins, and slight to severe stunting of the plants.

Development and production of pathogen-free propagative material of ornamental plants.—*Plant Dis. Reptr, Suppl.* 238, pp. 57–95, 1956.

The purpose of this collection of papers by members of the Ornamental Crops Sub-Committee of the Committee on Seed and Plant Material Certification of the American Phytopathological Society is to present selected examples of the successful propagation of pathogen-free stock of ornamentals. Methods are outlined for the detection of infected or infested material, for obtaining the original stock of pathogen-free material, and for maintaining it in this condition during commercial propagation, the degree of success of each programme being considered.

A. W. Dimock, in his paper on production of chrysanthemum propagating material free from certain major pathogens (pp. 59–62), deals with leaf spots caused by *Septoria obesa* [30, p. 368] and *S. chrysanthemella* [24, p. 192], rust (*Puccinia chrysanthemi*) [35, p. 527], *Mycosphaerella* ray blight (*M. lignicola*) [29, p. 215], and *Verticillium albo-atrum* [21, p. 203], and gives the following summary programme. All stock plants for cutting production should be obtained from *Verticillium* indexed nucleus blocks, all nucleus and increase blocks being grown in sterilized solid-bottom ground beds or raised benches and the increase blocks sprayed every seven to ten days with zineb at 1 lb. per 100 gals. water. For propagation only short terminal cuttings from shoots which have grown 10 to 12 in. since the start of the control programme should be used and the rooting medium should be sterilized between each batch of cuttings.

P. Brierley and C. J. Olson (pp. 63–67) discuss development and production of virus-free chrysanthemum propagative material. K. F. Baker (pp. 68–71) deals with the production of seed of *Matthiola incana* free from bacterial blight (*Xanthomonas incanae*) [30, p. 108], *Zinnia elegans* [31, p. 239] from *Alternaria zinniae*, and *Tropaeolum majus* from *Heterosporium tropaeoli* [29, p. 564].

J. Tammen, R. R. Baker, and W. D. Holley (pp. 72–76) write on the control of carnation diseases by the cultured-cutting technique [34, p. 525]. E. C. Gasiorkiewicz and C. J. Olson contribute a section on progress in the development and production of virus-free carnation varieties (pp. 77–80). The procedures for eliminating carnation mosaic virus [35, p. 527], of which indexing on *Dianthus* spp. has proved the most reliable, are not yet in full commercial use. Incidence of carnation streak virus [28, p. 334] has been reduced to a minimum by commercial propagators by selective roguing and insect control, and these practices plus the discontinuance of susceptible varieties have made yellows virus disease [loc. cit.] relatively rare. J. G. Bald (pp. 81–84) discusses development and production of pathogen-free gladiolus cormels [36, p. 29].

S. Wilhelm and R. D. Raabe (pp. 85–87), in their paper on culture-indexing of budwood to provide greenhouse roses free from *Verticillium albo-atrum* [31, p. 65], report that tests and field observation over a three-year period indicated resistance in the Manetti rootstock to natural root infection by the strain of the fungus prevalent in California; a strain to which it is susceptible has since been isolated. K. F. Baker and P. A. Chandler (pp. 88–90) deal with development and production of pathogen-free propagative material of foliage and succulent plants. E. W. Lyle (pp. 91–92), discussing development of rose propagative material free from black spot (*Diplocarpon rosae*) [35, p. 380], states that the practice of starting with pathogen-free scions and using the immune *Rosa multiflora* understock delays, but does not entirely prevent, the development of the disease under Texas field conditions. D. E. Munnecke (pp. 93–95) writes on development and production of pathogen-free propagative material of *Pelargonium hortorum* [35, p. 189].

Shanks (J. B.). **Prevention of Rhizoctonia stem rot in young plants.**—*Flor. Exch.*, 127, 26, p. 12, 1956. [Abs. in *Biol. Abstr.*, 31, 6, p. 1808, 1957.]

In greenhouse tests at Maryland University, College Park, terraclor gave effective control of damping-off or stem rot of carnations, snapdragons [*Antirrhinum*], and poinsettias [*Euphorbia pulcherrima*] caused by *Rhizoctonia* [? *Corticium solani*: cf. 30, pp. 41, 611] inoculated into steamed soil. Used at 1 lb. of 75 per cent. wettable powder in 100 gals. water (1 qt. per sq. ft.) the fungicide was reasonably harmless to all three hosts.

Turian (G.). **Exaltation de l'activité catalasique dans les tissus d'Euphorbia cyparissias parasitée par Uromyces pisi.** [Enhancement of catalase activity in the tissues of *Euphorbia cyparissias* parasitized by *Uromyces pisi*.]—*C. R. Acad. Sci., Paris*, 244, 26, pp. 3167–3169, 1 graph, 1957.

Continuing his studies on the enzymatic pathology of *Euphorbia cyparissias* parasitized by *Uromyces pisi* in Switzerland [cf. 36, p. 485], the author found that the destruction of hydrogen peroxide by catalase, measured with the Warburg respirometer, was accomplished much more actively in the presence of extracts of infected than in those of healthy leaves.

Stathis (P. D.) & Plakidas (A. G.). **Anthracnose of Azaleas.**—Abs. in *Phytopathology*, 47, 5, p. 314, 1957.

Epidemic defoliation of azaleas [*Rhododendron*] in Louisiana in 1954–6, following the appearance of innumerable small, brown, mostly circular spots on the leaves, and affecting both the Indian and Kurume varieties, was demonstrated by

inoculation tests to be caused by *Glomerella cingulata*. Condial production occurs abundantly on the fallen leaves, but not on the plant. The disease was distinct from that caused by *Colletotrichum azaliae*.

ROSEN (H. R.). **Spraying with copper oxychloride sulfate for the control of black spot and powdery mildew of Roses.**—*Plant Dis. Reptr*, 41, 3, pp. 209–210, 1957.

Complete control of black spot [*Diplocarpon rosae*] of roses [36, p. 322] was obtained at Tulsa, Oklahoma, in 1956, by spraying at three-week intervals with COCS. The success of this product in Oklahoma as compared with its comparative failure in New York State [loc. cit.] was doubtless due in part to climatic differences.

MILIČIĆ (D.). **Rasprostranjenje Kakteja s virusnim tijelima u primorskim krajevima Jugoslavije.** [Distribution of Cacti with virus bodies in coastal regions of Yugoslavia.]—*Biol. Glasn.*, 9, pp. 21–25, 1956. [German summary.]

In a survey of the Dalmatian coast of Yugoslavia in July, 1955, cactus plants growing naturally were found to be free from viruses, though a number of cultivated forms, including *Opuntia monocantha*, *O. microdasys*, and *O. brasiliensis*, showed signs of infection [cf. 35, p. 746]. In order to prevent the spread of infection diseased plants should not be introduced into these regions and those already there should not be multiplied.

BOS (L.). **Heksenbezemverschijnselen bij Tropaeolum majus L.** [Witches' broom symptoms on *Tropaeolum majus* L.]—Abs. in *Tijdschr. PlZiekt.*, 63, 1, p. 24, 1957.

In September, 1955, a number of *Tropaeolum majus* plants in the arboretum at Wageningen, Netherlands, showed marked symptoms of witches' broom [see above, p. 635]. All stages in the process of transformation from a normal flower to a vegetative branch with leaves (antholysis) were observed. Eventually even the receptacle developed into an extensively branching shoot. The numerous axillary buds formed on these branches and the resultant laterals branched again and again to give dense brooms. Grafting experiments are in progress to determine whether a virus is responsible.

MCWHORTER (F. P.). **Virus diseases of Geranium in the Pacific Northwest.**—*Plant Dis. Reptr*, 41, 2, pp. 83–88, 3 figs., 1957.

The following virus diseases of *Pelargonium* spp. were observed in a survey in Oregon and Washington: crinkle (leaf curl) virus [35, p. 189]; a disease causing bright yellow or white spots on occasional leaves, possibly due to [tomato] spotted wilt virus, affecting particularly cuttings from California; mosaic [loc. cit.], for which the name leaf breaking is preferred, probably caused by strains of cucumber mosaic virus; and leaf cupping (?[beet] curly top) virus [12, p. 446].

MCWHORTER (F. P.). **A localized occurrence of Cucumber mosaic virus in Gladiolus.**—*Plant Dis. Reptr*, 41, 3, pp. 141–142, 1957.

No satisfactory explanation is at present available for an unprecedented outbreak of cucumber mosaic virus causing white break of gladiolus in a later planted part of a field in the Portland area of Oregon in 1956 [cf. 34, p. 369], in which 98 per cent. infection was recorded. In the rest of the field the same varieties of similar origin remained healthy. Infection was by vectors, and the phenomenon calls for an investigation of clovers and grasses as potential hosts of cucumber mosaic virus, strains of which from gladiolus show extreme variability.

SCHMELZER (K.). **Die Passage durch Stellaria media in ihrer Bedeutung für die mechanische Übertragung von Viren an Nelken.** [Passage through *Stellaria*

media in relation to its significance for the mechanical transmission of Carnation viruses.]—*Phytopath. Z.*, 28, 4, pp. 457–460, 1 fig., 1957.

In further studies on virus inhibition at the Institute for Phytopathology, Aschersleben, Germany [36, p. 173], *Stellaria media* reacted to mechanical inoculation with ring spot virus [35, p. 100] from *Dianthus barbatus* or carnation by the development of a dark and pale green mosaic pattern on the apical leaves, which were also slightly swollen but not necrotic. A total of 263 lesions appeared on four Samsun tobacco leaves rubbed with undiluted expressed sap from infected *S. media*, and 73 on six primary Prince bean (*Phaseolus vulgaris*) leaves similarly treated. In two further tests the results of inoculation of tobacco and bean leaves with undiluted saps containing ring spot virus from *D. barbatus*, carnation, and *S. media* were compared. The lesions on tobacco numbered three, four, and 277, respectively, and on bean none from the *Dianthus* spp. and 123 from *S. media*.

In combination with tobacco mosaic virus on *Nicotiana glutinosa* and tobacco, turnip mosaic and carnation ring spot viruses on tobacco, and southern bean mosaic virus on bean, *D. barbatus* and carnation saps caused more than 99 per cent. inhibition, while the action of *S. media* was appreciably weaker.

Wade (G. C.). **Diseases of pasture plants in Tasmania.**—*Tasm. J. Agric.*, 28, 1, pp. 64–69, 5 figs., 1957.

From Tasmania are reported rust on *Lolium perenne*, the most widespread and important of the grass diseases, caused by *Puccinia coronata* [cf. 36, p. 249] and (less frequently) by *P. graminis*; pink patch (*Corticium fuciforme*) [35, p. 896], particularly on the better-quality grasses such as *L. perenne*; slime mould (*Physarum cinereum*) on pastures and lawns; ergot (*Claviceps purpurea*), most common on *L. perenne*; and blind seed disease of *L. perenne* caused by *Phialea* [*Gloeotinia*] *temulenta* [35, p. 695].

Rust (*Uromyces trifolii*) [cf. 36, p. 455] is widespread on subterranean clover but rarely causes serious damage. White clover is most commonly attacked by *Sphaerulina trifolii* [cf. 36, p. 103] and red clover occasionally by *Pseudopeziza trifolii* [cf. 34, p. 726]. Uncommon diseases of clover are *Mycosphaerella carinthiaca* [cf. 35, p. 661] and *Sclerotinia* sp. [cf. 36, p. 103].

Little leaf virus [? lucerne witches' broom virus: 36, p. 190] was first observed on subterranean clover in Tasmania in 1950 and has since spread rapidly, no control measures being known.

Cappellini (R. A.). **Hay molds and the fungitoxicity of 2,4,6-trichlorophenol.**—*Diss. Abstr.*, 16, 5, p. 849, 1956.

Twenty species of *Aspergillus*, *Penicillium*, *Alternaria*, *Cladosporium*, *Rhizopus*, and *Scopulariopsis* were common in samples of lucerne, birdsfoot trefoil [*Lotus corniculatus*], brome grass [*Bromus*], red clover, timothy [*Phleum pratense*], timothy-clover, and timothy-clover-lucerne hays stored for 15 months at 20° C. and relative humidities from 72 to 95 per cent. They were absent from samples stored at 66 per cent. relative humidity, but appeared within a week when this was raised to 95.

Quantitative studies at Cornell University showed that spores of *P. cyclopium*, *Aspergillus niger*, *A. ochraceus*, *A. versicolor*, *C. herbarum*, and *R. nigricans* [*R. stolonifer*] absorbed from 15,900 to 156,800 p.p.m. TCP on a spore weight basis from solutions which caused 50 per cent. inhibition of germination, an indication of the low toxicity of TCP for these spores.

Couch (H. B.) & Cole (H.). **Chemical control of melting-out of Kentucky Bluegrass.**—*Plant Dis. Reptr*, 41, 3, pp. 205–208, 1957.

In field tests by the University of Pennsylvania, University Park, using a leaf-sampling method (which is described) to measure the percentage leaf area covered

by lesions, significant inhibition of the leaf spot phase of *Helminthosporium vagans* on Kentucky bluegrass (*Poa pratensis*) [35, p. 460] was obtained with actidione [cf. 35, p. 894], kromad [a cadmium complex; cf. 35, p. 680], omadine (the disulphide derivative of 2-pyridinethione l-oxide), captan 50-W, and terramycin. The best results were obtained with two applications (22nd May and 1st June) of omadine, kromad, and captan 50-W at 200 gm., 4 oz., and 4 oz. per 1,000 sq. ft., respectively, which significantly increased yield by reducing leaf abscission. Actidione at 1,200 mg. was equally effective, but caused a temporary growth reduction.

None of the materials tested gave satisfactory control of *H. dictyoides* on Illahee fescue (*Festuca rubra*) [cf. 34, p. 459], possibly the low amount of diluent used (1·25 gals. per 1,000 sq. ft.) not enabling the materials to reach the crowns and bases of the leaf sheaths. Terraclor at 4 oz. proved markedly phytotoxic.

FREEMAN (T. E.). **A new Helminthosporium disease of Bermuda Grass.**—*Plant Dis. Reptr*, **41**, 5, pp. 389–391, 1 fig., 1957.

A leaf spot of Bermuda grass (*Cynodon dactylon*) in Florida, due to *Helminthosporium stenospilum*, constitutes a new host record for this fungus, and causes somewhat greater damage than *H. cynodontis* [cf. 32, p. 131].

BRIGHAM (R. D.). **Stem lesions associated with Xanthomonas alfalfae.**—*Phytopathology*, 47, 5, pp. 309–310, 1 fig., 1957.

An outbreak of bacterial leaf spot of lucerne (*Xanthomonas alfalfae*) [14, p. 766] in Iowa in the summer of 1956 is reported from Iowa State College, Ames. The stem lesions which were also observed are superficially similar to those of *Phoma herbarum* var. *medicaginis* [35, p. 828] and *Cercospora medicaginis* [35, p. 20]; their occurrence was accompanied by stem breaking, which, together with the appearance of the disease in commercial fields as opposed to nurseries, is recorded apparently for the first time.

HELMS (KATIE). **Witches' broom disease of Lucerne. I. The occurrence of two strains of the disease and their relation to big bud of Tomato. II. Field studies on factors influencing symptom expression, disease incidence, and mortality rate.**—*Aust. J. agric. Res.*, 8, 2, pp. 135–147, 4 pl.; pp. 148–161, 2 pl., 1 graph, 1957.

Transmission by grafting and by dodder (*Cuscuta campestris*) of lucerne witches' broom virus [cf. 32, p. 668] at Canberra in 1947–52 extended the known host range to include *Calendula officinalis*, *Crotalaria goreensis*, *Datura tatula*, lettuce, *Nicotiana glutinosa*, *N. rustica*, tobacco, and petunia. Two selected lucerne plants from the field were found to be infected by distinct strains. On 14 host species, including tomato and lucerne, one strain (B) produced symptoms indistinguishable from those of tomato big bud virus [33, p. 208]; the other (A) caused less severe proliferation and no greening of the floral parts.

Field observations between 1947 and 1950 in the Lachlan and Murrumbidgee Valleys, New South Wales, showed that there was masking of symptoms in spring. Maximum symptom expression occurred in late summer and early autumn. Rainfall and temperature (or an environmental factor varying relatively to the annual temperature cycle, e.g. day length and light intensity) influenced the time and intensity of symptom expression. During the growing season severe symptoms were associated with hot, dry conditions and mild symptoms with high rainfall. Green flowers occurred in some infected plants at midsummer.

More diseased plants and a higher death rate were noted on river terraces than on river flats. Incidence of the disease and rate of infection were greater in old stands, and young ones when sparse but not dense.

The disease was an important factor in reducing the density of 10-year-old

lucerne stands in the Lachlan Valley. The minimum observed life of infected plants was under two months, the maximum being 33 months in the field and 54 in the greenhouse.

Matsulevich (B. P.). Влияние Клеверных мозаик на продуктивность Красного Клевера. [The effect of Clover mosaics on the productivity of Red Clover.]—Агробиология. [*Agrobiology, Moscow*], *1957*, 2, pp. 75–79, 1957.

Field experiments and observations in the Ukraine, U.S.S.R., in 1953 and 1954 showed that infection of red clover by clover mosaic virus [cf. 35, p. 260] and clover vein mosaic virus [cf. 33, p. 485] impaired the quality, weight, and germination of the seed, retarded plant growth, and reduced the production of flowers and leaves. The vein mosaic virus was predominant.

The presence of the viruses in isolated plots sown with seed from apparently healthy plants and protected from insect vectors is taken to indicate that among the plants selected for seed there were some with slight symptoms that had escaped notice. Moreover, the expression of one type of symptom does not necessarily indicate that the plant is not also infected by other viruses.

Schøyen (T. H.) & Jørstad (I.). **Skadedyr og sykdommer i frukt- og baerhagen. 4. Utgave.** [Pests and diseases in the orchard and small-fruit garden. Fourth edition.]—197 pp., 23 col. pl., 115 figs., Oslo, H. Aschehoug & Co., 1956. Kr. 20.70.

This useful, practical treatise [22, p. 257] on the occurrence and control in Norway of pests and diseases of orchard and garden fruits, and disorders due to nutritional deficiencies, adverse climatic factors, and chemical injuries has again been revised and enlarged.

Mezzetti (A.), Baldassari (T.), & Vespignani (A.). **La 'plara' delle Mele. III. Influenza di alcuni fattori ambientali sull'incidenza della 'plara propriamente detta'. Prove orientative. A. Interventi agronomici. I. Descrizione delle prove. Risultati numerici e loro analisi.** ['Plara' of Apples. III. The effect of certain environmental factors on the incidence of 'plara, properly so-called'. Preliminary tests. A. Agronomic treatments. I. A description of the tests. The numerical results and their analysis.]

Mezzetti (A.). **La 'plara' delle Mele. IV. A. 2. Induzioni e primo tentativo di interpretazione.** ['Plara' of Apples. IV. A. 2. Conclusions and a first attempt at an explanation.]—*Ann. Sper. agr.*, N.S., 11, 2, pp. 361–398, 2 diags., 6 graphs; pp. 399–421, 10 graphs, 1957. [English summaries.]

In the first of these papers [cf. 36, p. 327] details are given with tabulated data of work conducted in 1951–2 and 1953–4 in two experimental orchards in the provinces of Bologna and Ferrara, Italy, to determine the influence of pruning, mineral nitrogenous fertilizers, irrigation, and weather conditions on the incidence of non-parasitic 'plara' disease of Abbondanza apples during ordinary and cold storage.

In the second paper it is tentatively concluded that the cultural and morphological data can be explained by supposing that a 'sap shock', i.e. a sudden and rapid tissue-swelling, can kill a number of scattered or grouped cells in the flesh and that these are liable to a slow darkening and enlargement which becomes visible externally. Sap shock would be induced by rain and fog in September–October, when the roots are still actively absorbing water; it would be more severe in young trees with a light fruit load, heavily pruned, and to which nitrogenous fertilizers had been extensively applied, especially if the fruits had previously been affected by drought.

Sooty blotch of Apples.—*Tasm. J. Agric.*, 27, 4, p. 342, 1 fig., 1956.

Although the fungus has probably been present in Tasmania for many years, the first significant incidence of sooty blotch (*Gloeodes pomigena*) [cf. 36, p. 104] of apple occurred during the 1955–6 season. The superficial blemishes were easily removed.

Ward (J. R.). **Winter control of orchard diseases.**—*Tasm. J. Agric.*, 18, 2, pp. 127–134, 5 figs., 1957.

Notes are given on control measures recommended during the winter against a number of common orchard diseases in Tasmania. Owing to the vast areas covered by the apple orchards and the late harvest of some varieties it is generally uneconomic to attempt to eradicate black spot [*Venturia inaequalis*: 34, p. 599] by autumn spraying with organo-mercurials [cf. 36, p. 456]. In isolated, badly infected orchards, however, a ground spray of 400 gals. of ½ per cent. DNC plus 1 lb. emulsit per acre may be applied in August after ploughing in the leaves, the ground then being left undisturbed as long as possible. Against pear black spot [*V. pirina*: 34, p. 599] the spray should be applied about a fortnight earlier.

Ripe spot and target rot of apples is caused by *Gloeosporium album* [36, p. 328], *G. fructigenum*, and *G.* [*Neofabraea*] *perennans*; strict sanitation of infected material is necessary.

In the Spreyton area an eradication campaign against the *Nectria* sp. on apple [35, p. 351] is in progress. Infected orchards were sprayed with 0·3 per cent. phenyl mercury chloride in May, 1955, and all infected wood was burned. In the winter of 1956 one orchard appeared free from infection.

Deficiencies of zinc and boron in fruit trees are best remedied in August by spraying the trees with zinc sulphate at 50 lb. in 100 gals. and by applying soil dressings of ½ to 1 lb. borax per tree. Magnesium deficiency was first recorded in March, 1956 [? in apple trees] at Geeveston. Magnesium sulphate may be applied as a spray (20 lb. per 100 gals.) from the calyx stage onwards or as a soil dressing of 6 to 12 lb. round each tree in August.

Kirkham (D. S.). **Relationships between cultural characters and pathogenicity in Venturia inaequalis and Venturia pirina.**—*J. gen. Microbiol.*, 16, 2, pp. 360–373, 2 graphs, 1957.

In studies at East Malling Research Station on single conidial isolates of *Venturia inaequalis* from apple and *V. pirina* from pear [36, p. 35] maximum sporulation of both species in culture was associated with minimum development of aerial mycelium. Among isolates of *V. inaequalis* changes in colony or sporulation types during storage in culture, indicating a deviation from the wild type, were accompanied by decreased pathogenicity on Cox's Orange Pippin. The most stable isolates had the widest host ranges on the varieties tested. In all isolates of *V. pirina* cultural characters remained stable while pathogenicity declined rapidly during storage. No major difference in nutritional requirement was detected between the two species or between isolates which differed from each other in pathogenicity and other characteristics.

Fisher (Eileen E.). **A species of the genus Venturia, the ascigerous stage of Fusicladium carpophilum (Thüm.) Oudem.**—*Nature, Lond.*, 179, 4573, p. 1309, 1957.

At the Biology Branch, Victorian Department of Agriculture, Melbourne, fallen leaves from an apricot tree infected by freckle (*Fusicladium carpophilum*) [34, p. 284] from an orchard at Inverleigh, Victoria, were collected in August, 1955, and the pathogen cultured from bicellular, olive-buff spores ejected from them. Conidia from these cultures subsequently infected a healthy apricot in a freckle-free area.

In a histological examination of the overwintered leaves spherical to subspherical perithecia were found immersed in the tissue, measuring from 60 to 160 μ in diameter and with occasional bristles. Each perithecium contained eight-spored, saccate-cylindrical asci, 48 to 56 by 5 to 6 μ. The olive-buff ascospores were 12 to 16 by 3 to 5 μ, and each spore was divided by a median septum into two cells of equal length. The cell nearer the apex of the ascus was usually broader than the tapering lower cell. On the basis of these observations the perfect state of *F. carpophilum* is regarded as a species of *Venturia*.

WADE (G. C.). **The control of brown rot of Apricots by fungicides.**—*Tasm. J. Agric.*, 27, 4, pp. 317–328, 8 figs., 1956.

Further information is given on spray tests in Tasmania during 1952–6 against brown rot [*Sclerotinia fructicola*] of apricot [36, p. 195]. Descriptions are given of the injury caused to apricot fruits and leaves by some copper and sulphur fungicides, nabam plus zinc sulphate, ziram, dichlone, chloranil, lauryl isoquinilinium bromide, captan, and phenyl mercuric triethanalamine lactate. Salicylanilide, nirit, mannam, and ferbam were non-injurious at all times.

GUALACCINI (F.). **Un virus dei Ciliegi.** [A virus of Cherries.]—*Ital. agric.*, 94, 1, pp. 81–87, 8 figs., 1957.

In June, 1956, cherry trees of the Durona vera and Durona della Marca varieties in the Guiglia region of Modena were observed to be affected by a virosis. When buds from diseased trees were grafted on *Prunus serrulata* vars. *shirofugen* and *kwanzan*, typical [cherry] ring spot [peach ring spot] symptoms developed. This is stated to be the first authentic record of the disease in Italy [cf. 35, p. 374].

FUCHS (A.), GROSJEAN (J.), KRYTHE (Miss J. M.), & REIJENGA (T. W.). **Bacteriekanker bij steenvruchten. I. Symptomen en ziekteverloop bij Kers en Pruim.** [Bacterial canker in stone fruits. I. Symptoms and course of the disease in Cherry and Plum.]—*Tijdschr. PlZiekt.*, 63, 2, pp. 33–44, 3 figs., 1957. [English summary.]

At Wageningen, Netherlands, a comparative study was made of the behaviour of bacterial canker of cherry and plum [*Pseudomonas mors-prunorum* and *P. syringae*: cf. 35, p. 198; 36, p. 252; and next abstract] which causes serious losses, with that in other countries. In general the symptoms agreed with those described elsewhere but there were certain differences. In cherry trees crotch cankers, often strongly developed, prevailed, while gum production, sometimes copious, often continued throughout the season. In 1955, leaf fall following wilting began in a number of affected Early Rivers trees in early September. The most susceptible varieties were Early Rivers and May cherry and of some 500 trees of the former examined at Malden in 1955 only 25 per cent. were healthy, while 50 per cent. were lightly to moderately and 25 per cent. severely affected; the comparable figures for 200 trees of the latter variety examined at Bemmel in the same year were 54, 35, and 11 per cent., respectively. Of the plum varieties only Ontario proved very susceptible and, contrary to Wormald's general finding for plums, die-back of twigs and young shoots was more prominent than branch or crotch cankers. Alternation between a winter canker phase and a summer leaf phase was indistinct, and in wet summers particularly cankers were observed to continue development throughout the year, sometimes for several years, though isolations from them after June were seldom successful.

Inoculation of the leaves without wounding was effective only on the lower surface, suggesting the stomata, restricted to this surface in *Prunus*, as the route of entry. In the summer of 1954 the bacteria could be isolated from petioles and twigs 13 days after inoculation of the leaf blade (though not under the very hot

conditions in the following year), so sometimes infection of the twigs may occur by way of the leaves before leaf fall.

Fuchs (A.). **Bacteriekanker bij steenvruchten. II. De identiteit van Pseudomonas mors-prunorum Wormald en Pseudomonas syringae Van Hall.** [Bacterial canker in stone fruits. II. The identity of *Pseudomonas mors-prunorum* Wormald and *Pseudomonas syringae* Van Hall.]—*Tijdschr. PlZiekt.*, 63, 2, pp. 45–57, 2 figs., 1957. [English summary.]

After a preliminary examination of numerous strains of *Pseudomonas* from peach, cherry, and plum [see preceding abstract] at the Laboratory for Microbiology, Delft, Netherlands, ten were selected for closer study. These were examined by Wormald's criteria for differentiating *P. mors-prunorum* and *P. syringae* [12, p. 227; 18, p. 122]. At the initial examination nine could be assigned to the former and one to the latter species. However, when all were re-examined after serial transfer for one year on peptone agar (with or without 2 per cent. glycerine), two of the nine were found to exhibit the characteristics of *P. syringae*, and there were other anomalous findings. All strains formed pale green, fluorescent pigment on Uschinsky's medium, on which *P. syringae* had been stated to produce a clearly detectable yellow colour, and *P. mors-prunorum*, if it grew at all, either no coloration or a pale yellow. On difco nutrient agar with 2 per cent. lactose and bromcresol purple only four of the strains produced a colour change. The findings were taken to invalidate Wormald's differential criteria, the more so when identical symptoms were produced on leaves of cherry, peach, and plum by all the strains.

These strains also proved pathogenic to a number of plants unrelated to *Prunus*, including balsam [*Impatiens*], bean [*Phaseolus vulgaris*], lemon, lilac, lupin, pear, and red clover. The author therefore proposes that *P. mors-prunorum*, like a number of other pathogens already so treated, be included in *P. syringae*.

The saprophyte *Aerobacter levanicum* was also isolated from cherry and plum gum; it resembles the *Pseudomonas* strains causing cankers in forming slimy hemispherical colonies with a distinct radial structure on sucrose-containing agar media.

Richards (B. L.) & Cochran (L. C.). **Virus and viruslike diseases of stone fruits in Utah.**—*Bull. Utah agric. Coll.* 384, 130 pp., 11 col. pl., 67 figs., [? 1956.]

Symptoms of the virus diseases of peach, chokecherry (*Prunus virginiana* var. *demissa*), sweet and sour cherry, and plum occurring in Utah are described and illustrated in this handbook. Other sections deal with the control of stone fruit viruses, non-transmissible disorders with viruslike symptoms, and disorders caused by incorrect nutrition or chemical injuries which may be confused with virus diseases.

Kristensen (H. R.) & Christensen (M.). **Solbær-Ribbesvind (Ribes virus 1, Acrogenus ribis).** [Reversion of Black Currant (*Ribes* virus 1, *Acrogenus ribis*).] —*Tidsskr. Planteavl*, 61, 1, pp. 1–16, 4 figs., 1957. [English summary.]

In most of the nurseries under official supervision in Denmark reversion virus of black currant [34, p. 347] has been largely eliminated by an inspection and certification scheme which has been in operation since 1949, but infection is still widespread in private gardens.

The results of experiments carried out from 1950 to 1954 indicated that symptoms developed irrespective of the type of fertilizer applied or of pruning, though they were most severe in bushes grown at a low potassium level. Control is most likely to be achieved by rigorous inspection and roguing in the nursery combined with stringent selection of healthy mother plants.

Craig (D. L.). **A two-year comparison of virus-free and common stock Strawberry plants.**—*Plant Dis. Reptr*, 41, 2, pp. 79–82, 1957.

At the Canada Department of Agriculture Experimental Farm, Kentville, Nova Scotia, virus-free strawberry plants of four varieties from indexed stock released at Beltsville, Maryland, gave significantly higher yields in the field than common stock maintained at the Farm for a number of years [cf. 35, p. 420]. In 1955 the mean yield in lb. per acre was 16,966 compared with 5,263 and in 1956, 14,891 and 9,735. The lower yield of the indexed stock in 1956 was to be expected, in view of exposure to re-infection.

Kerr (A.). **'Red core' disease of Strawberries.**—*J. Dep. Agric. S. Aust.*, 60, 8, pp. 354–356, 3 figs., 1957.

Red core disease (*Phytophthora fragariae*) was found on strawberries on eight properties in the Adelaide Hills, South Australia, in November, 1956, this being the first record of the disease in Australia [map 62]. Symptoms, etiology, and control measures are briefly described.

Official F.D.A. tolerances listed.—*Nat. agric. chem. Ass. News*, 15, 4, pp. 5–14, 1957.

In this further compilation [cf. 35, p. 836] pesticide tolerances established by the Food and Drug Administration [of the United States], up to 30th April, 1957, are catalogued under 87 crop headings. Exemptions are again listed.

Tolerances for residues of zineb.—*Fed. Reg.*, 22, p. 2147, 1957. [Abs. in *Chem. Abstr.*, 51, 10, col. 7598a, 1957.]

A tolerance of 25 p.p.m. is established under the Federal Food, Drug, and Cosmetic Act [cf. 36, p. 257] for residues of zineb in or on beet tops, spinach, Swiss chard, Chinese cabbage, mustard greens, collards, kale, endive, lettuce, and romaine.

Junghaehnel (R.). **Hauptanwendungsgebiete für Pentachlorophenol.** [Principal fields of application for pentachlorophenol.]—*Prakt. Chem.*, 7, 11, pp. 374–375, 1956.

Useful information is summarized on the manifold uses of pentachlorophenol [36, p. 365 *et passim*] in industry. As a timber preservative it is usually employed as a 5 to 10 per cent. solution in mineral oil, with the addition of 5 per cent. resin or of 10 to 20 per cent. linseed oil, fatty acids, or balsam turpentine oil to prevent the chemical from crystallizing out of the wood. The *dosis toxica* prescribed for [unspecified] fungi is 1·5 kg. per cu. m.

The control of [unspecified] blueing fungi on freshly cut conifer boards is effected by treatment (spraying or dipping) with a 2 to 2·5 per cent. solution of sodium pentachlorophenate [36, p. 224]. Hard water interferes with the solution of the compound, but precipitation may be obviated by an admixture of soda and softeners, e.g., tripolyphosphate, at a concentration of 0·15 gm. per l. and degree of hardness. To arrest infection in standing timber a 4 per cent. solution must be applied, especially to the most exposed side of the trees, immediately after decortication.

A 5 per cent. solution of sodium pentachlorophenate, introduced into the brickwork of buildings by the bore-hole method, arrests the progress of dry rot [*Merulius lacrymans*] and kills the fungus. The development of [unspecified] moulds on walls may be prevented by treatment with a 1 per cent. solution, while the admixture of 0·5 per cent. with the glue is effective against mildew on wallpaper. Sodium pentachlorophenate or pentachlorophenol may be incorporated with paints at a strength of 1 to 2, while glues are protected against mildew and rotting by an

admixture of 0·2 to 0·4 per cent. sodium pentachlorophenate (animal glues) or 0·1 to 0·2 per cent. (vegetable glues).

Other uses are found in the fibre, paper [cf. 35, p. 211], and textile industries [29, p. 323]; in the preparation of disinfectants; and in the manufacture of floor-polishing waxes.

Three colorimetric methods for the determination of pentachlorophenol in solutions are briefly indicated.

Mahapatra (G. N.). **Synthesis of isomeric bromothiazolylamines and the use of their mercurated derivatives as fungicides and bactericides.**—*J. Amer. chem. Soc.*, 79, 4, pp. 988–990, 1957.

In this expanded report of assays of synthesized and mercurated bromothiazolylamines for their activity against *Piricularia oryzae* [35, p. 695] the phenylthiazolylamines containing bromine in the thiazole nucleus are stated to be the most potent, inhibiting sporulation completely at a concentration of 30 p.p.m. All the tri- and a few dibromo derivatives with a bromine atom in the thiazole nucleus showed slightly enhanced toxicity to the fungus. All the mercurated compounds exerted a powerful fungicidal effect, especially those with a bromine atom in the thiazole nucleus, which totally suppressed spore germination at a strength of 1 to 2 p.p.m.

Kaszonyi (S.). **Palánták rizoktónias szártőrothadása elleni védekezés 'Fuklasin F'-fel.** [Control of *Rhizoctonia* of seedlings with the help of 'fuclasin F'.]—*Növénytermelés*, 5, 1, pp. 77–86, 5 figs., 1956. [Russian and English summaries.]

Experiments in Hungary during 1952–5 showed that *Rhizoctonia* [*Corticium*] *solani* is the most common cause of seedling infection in a number of crops grown in the greenhouse, hotbed, and field. In trials carried out each year during September to May on Scarlet Down tomato, Bogyiszló [chilli] pepper, and Braunschweig common white cabbage growing under greenhouse and hot-bed conditions in soil inoculated with a tomato strain of the fungus, fuclasin F [cf. 29, p. 37], mixed with the soil covering the seed at 160 to 200 gm. per sq. m., was fungistatic (though not fungicidal) and increased germination. It proved superior to the standard zinc oxide treatment used in Hungary. Re-infection is possible but not during the six weeks required for raising the seedlings unless the chemical is removed by repeated watering.

Braun (H.) & Riehm (E.). **Krankheiten und Schädlinge der Kulturpflanzen und ihre Bekämpfung. Achte, neubearbeitete Auflage.** [Diseases and pests of cultivated plants and their control. Eighth, revised edition.]—viii+368 pp., 344 figs., 2 diags., Berlin, Paul Parey, 1957. DM 29.80.

In their foreword to the eighth edition of this valuable work [cf. 30, p. 53] the authors state that few alterations have been made. The sections on soy-bean and on leaf blotch of sugar beet [*Clasterosporium putrefaciens*: 31, p. 536] have been eliminated, while fruit viruses and collar rot [*Phytophthora cactorum*: 36, p. 473] of apples are discussed for the first time. The bibliography has been considerably enlarged, with works published abroad receiving more attention than heretofore.

Hristov (A.). Болести на културните растения в България (Специална фитопатология). [Diseases of cultivated plants in Bulgaria. Special phytopathology).]—634 pp., 86 figs., 2 graphs, State Publishers for Agricultural Literature, Sofia, 1956. Francs 21.10.

This book [35, p. 623] is based on 30 years of study and on data from Bulgarian and foreign literature (663 titles). The diseases, including those caused by fungi,

bacteria, and viruses, and their control are described with full illustrations. Crops dealt with include cereals, legumes, fodders, technical crops, fibres, oil plants, officinal plants, hops, tobacco, garden plants, vegetables, fruit, trees, and ornamentals. A glossary and an index to the Latin names of the pathogens are appended.

Fischer (G. W.) & Holton (C. S.). **Biology and control of the smut fungi.**—622 pp., 1 pl., 107 figs., New York, The Ronald Press Co., 1957. $10.00.

In addition to reviewing the available literature (the bibliography covers 147 pages) on the Ustilaginales [30, p. 432] the authors have also included some previously unpublished data in this comprehensive volume. The first chapter deals with morphology, taxonomy, and symptomatology, and includes a key to the genera of the Ustilaginales, a synopsis of the genera, and a host list with 1,100 smut species arranged under 77 host families. The remaining 12 chapters discuss history and economic importance (with an extensive section on losses), nomenclature and phylogeny, secondary effects on the host, life history and parasitism, growth on artificial media, cytology, hybridization, mutation and genetics, physiologic specialization, host variety reaction and the genetics of smut resistance, effects of smuts on man and animals, methods and techniques, and control practices. The book is well illustrated with original figures as well as reproductions from other publications (including many classical ones).

Amongst the hitherto unpublished data are the effects of inoculum density on the percentage of infection induced by *Ustilago bullata* in *Bromus catharticus* and *Agropyron trachycaulum*. At a concentration of 0·0000023 gm. spores per l. 1·2 per cent. infection of *B. catharticus* was obtained, while percentages over 59 needed 0·078 to 5 gm. The minimum density for *A. trachycaulum* was 0·0000095 gm. (1·3 per cent. infection) and the optimum 2·5 gm. (89 per cent.).

For many years the authors obtained satisfactory results in culturing smut fungi on an agar medium containing 4 per cent. dextrose, 2 per cent. malt extract, and 0·5 per cent. peptone. More recently a modified potato-sucrose agar was developed containing 200 gm. potatoes, 60 gm. sucrose, 20 gm. Difco dehydrated malt extract broth, 1 gm. peptone, and 20 gm. agar per l., which is used in studies on *U. striiformis* and other *U.* spp.

Yarwood (C. E.). **Powdery mildews.**—*Bot. Rev.*, 23, 4, pp. 235–300, 4 pl., 1957.

The author reviews and discusses, with 377 references to the literature (with most emphasis on that since 1933), various aspects of the powdery mildews (Erysiphaceae), with sections on the morphology, taxonomy and nomenclature, host range, losses caused by, symptoms, life-history, biologic specialization, host-parasite relationships, epidemiology and the conditions affecting it, and control [cf. 7, p. 346; 13, p. 127; 16, p. 632].

Current research, investigations, experiments.—*Orchard. N.Z.*, 30, 4, p. 7, 1957.

Field observations in New Zealand indicate that plum mosaic [plum line pattern] virus [34, p. 214] is responsible for marked losses. In recently established plots of diseased and healthy Doris trees at Oratia the virus reduced tree growth as measured by trunk circumference. At Levin nursery the inspection of budwood trees and discarding of all those showing symptoms have reduced the incidence of visible disease to a very low level.

In 1954 a sodium orthophenylphenate dip [cf. 35, p. 877] was found to be effective against wastage of lemons in transport and storage, but in 1955 at Tauranga a different formulation of the same material was unsatisfactory.

Roper (J. A.) & Käfer (Etta). **Acriflavine-resistant mutants of Aspergillus nidulans.**—*J. gen. Microbiol.*, 16, 3, pp. 660–667, 1 pl., 5 graphs, 1957.

At the Department of Genetics, University of Glasgow, the varying resistance of three independently obtained mutants of *Aspergillus nidulans* [33, p. 311] to acriflavine was found to be due to mutation in a single gene. Two of the mutant alleles were semi-dominant and the third almost completely recessive. Haploid and homozygous diploid resistant vegetative segregants, preferentially selected by acriflavine, are formed from diploid strains with any allele for resistance in heterozygous conditions, giving an additional tool for conducting analyses through the parasexual cycle.

Bertini (S.). **Su di un composto ad azione antibiotica prodotto da Ascochyta pisi Lib.** [On a compound with antibiotic action produced by *Ascochyta pisi* Lib.] —*Ann. Sper. agr.*, N.S., 11, 2, pp. 545–556, 2 figs., 4 graphs, 1957. [English summary.]

Studies at Pisa University, Italy, on the antibiotic substance (ascochitin) obtained from culture liquids and mycelium of *Ascochyta pisi* [36, p. 368] are described. The optimum pH for the production of the substance is 5 to 6 and the temperature 26° C. The activity of culture liquids tends to increase with age. The intensity of its effects is modest, but Gram-positive and (to a less extent) Gram-negative bacteria, yeasts, and fungi are all susceptible to it. It does not appear to be phytotoxic.

Craveri (R.) & Giolitti (G.). **An antibiotic with fungicidal and insecticidal activity produced by Streptomyces.**—*Nature, Lond.*, 179, 4573, p. 1307, 1957.

At the Montecatini Antibiotic Research Laboratories, Milan, a new antibiotic was isolated from a *Streptomyces* of the *S. tanaschiensis* type, and named flavensomycin. At concentrations of 0·05 μgm. per ml. it inhibited *Saccharomyces* and *Penicillium* spp. A wider range of fungi was inhibited at 5–50 μgm. Its insecticidal activity was ten times greater than that of DDT.

Hopwood (G. V.). **Antibiotics and plant protection.**—*Mfg Chem.*, 28, 1, pp. 5–8, 5 figs., 1957.

The progress achieved in the application of antibiotics (especially streptomycin) to the control of plant diseases is surveyed from 27 contributions to the literature, most of which have been noticed in this *Review*.

Cooke (W. B.) & Busch (K. A.). **Activity of cellulose-decomposing fungi isolated from sewage-polluted water.**—*Sewage industr. Wastes*, 29, 2, pp. 210–217, 1957.

To determine whether or not fungi could attack cellulose in aerobic pure culture and in competition with sewage organisms [cf. 36, p. 341] two sets of studies were made at the Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio. The first involved the comparison, singly and in four different mixtures, of 10 species isolated more or less frequently from sewage-polluted water, while specially prepared suspensions of mycelium and spores were used in the second.

The capacity of the organisms for the degradation of the cellulose in cotton duck was rated as follows on the basis of tensile strength tests. *Trichoderma viride*, *Myrothecium verrucaria*, *Aspergillus fumigatus*, and *Penicillium ochrochloron* were very active, while little or no activity was shown by *Gliomastix convoluta*, *P. lilacinum*, *Cladosporium cladosporioides*, *Geotrichum candidum*, *Fusarium aquaeductum*, and *Pullularia pullulans*. These results differ in part from those reported by White *et al.* [27, p. 486] and Siu [31, p. 394].

Mycelial inocula proved to be less effective in aiding the reduction of cellulose than spore suspensions on a raw sewage medium, whereas on 24-hour settled

domestic sewage, the same sterilized, and a carbon-free synthetic medium the relative positions were reversed.

It is concluded that raw settled sewage contains organisms capable of utilizing cellulose as a carbon source in the presence of other species which may remove toxic materials, provide growth-promoting substances, or both.

Smyk (B.). **Effect of microflora on the amylolytic action of malts.**—*Przl. Spoz., 1956* (ii), pp. 22–25; *Pol. tech. Abstr., 1956*, 4 (24), p. 87, 1956. [Abs. in *J. Inst. Brew.*, N.S., 54, 3, p. 253, 1957.]

The analysis of 178 samples of Polish distillery malt (barley and mixed grain) revealed mould infection in 10 to 75 per cent. From 58 samples 12 species of yeasts, 36 of moulds, and 12 of streptomycetes were isolated, the numbers ranging from 48 to 930 million per gm. The corresponding figures for brewery malts were 27 to 250 million. The infected samples showed a decrease in amylolytic activity. *Penicillium expansum*, one of the species isolated, was strongly parasitic on germinating grains of both barley and rye, while a weaker action was exerted by *Fusarium herbarum* and *Rhizopus nigricans* [*R. stolonifer*].

Pohl (R. W.). **A rapid softening agent for dried plant structures.**—*Proc. Iowa Acad. Sci.*, 61, pp. 149–150, 1954. [Received 1957.]

A description is given of a solution in use in the Department of Botany, Iowa State College, which in addition to softening dried plant tissue and hardwood fungi is also useful in the preparation of liquid mounts of fungi possessing spores or other structures resistant to wetting. The solution contains 1 per cent. dioctyl sodium sulphosuccinate (aerosol OT) [obtainable in Britain as 'alcopol O' from Alloid Colloids (Mfg) Co. Ltd., Valley Rd., Bradford 2, Yorks.], 74 per cent. distilled water, and 25 per cent. methyl alcohol.

Echandi (E.) & Walker (J. C.). **Pectolytic enzymes produced by Sclerotinia sclerotiorum.**—*Phytopathology*, 47, 5, pp. 303–306, 4 graphs, 1957.

A study at the University of Wisconsin, Madison, showed that on wheat bran *Sclerotinia sclerotiorum* [cf. 34, p. 741] produces pectin methyl esterase and polygalacturonase; pH 4 was optimal for enzyme activity, which was destroyed by exposure to 55° C. for 10 min. The power of the enzymes to macerate carrot tissue was reduced in extracts of radish and carrot roots and of cucumber fruit (all susceptible), somewhat more so in potato extracts (resistant) [cf. 20, p. 419], and completely so in extract of onions. The pectolytic enzymes of *S. sclerotiorum* thus differ from those of *Erwinia aroideae* [cf. 35, p. 594], the depolymerase of which is most active at pH 9.

Chattopadhyay (S. B.). **Effect of age and storage conditions on the susceptibility of certain vegetables to attack by tissue-rotting fungi.**—*Indian J. mycol. Res.*, 1, 1–2, pp. 39–74, 1 fig., 8 graphs, 1955. [Received April, 1957.]

At the Department of Plant Pathology, Imperial College of Science and Technology, London, the susceptibility of potatoes, swedes, turnips, and carrots to attack by tissue-rotting fungi was increased by pre-storage at 30° to 35° C. as compared with 15°. The tubers or roots were inoculated after pre-storage and then stored at 20°, the effect of high temperature pre-storage period depending on its length. Young immature potato tubers were susceptible to *Botrytis cinerea*, *Fusarium fructigenum*, and *Rhizopus nigricans* [*R. stolonifer*], which are normally non-pathogenic to potato; susceptibility was low during dormancy and increased again with sprouting. Conversely, young tubers were resistant to *Pythium debaryanum* and *Phytophthora erythroseptica* which attack mature tubers. The susceptibility of dormant tubers was increased by treatment inducing sprouting.

Pre-treatment of vegetable tissues by heat increased the absorbing capacity of the cells and increased the susceptibility of the cell wall to decomposition by fungal enzymes. The exosmosis of salts and sugars was also increased, with stimulatory effects on fungal germination. The effect of maturity on susceptibility was associated with the exosmosis of nutrients.

Enzyme extracts from *Pythium debaryanum* were more effective in macerating standard disks in potato tissue than similar extracts from *B. cinerea* [cf. 34, p. 667].

GREGOR (J. W.). **Director's report.**—*Rep. Scot. Pl. Breed. Sta., 1957*, pp. 5–24, 1957.

This report states, *inter alia*, that a laboratory test for assessing the relative degree of field resistance to *Phytophthora infestans* [see next abstract] in potato varieties and seedlings has been devised at the Scottish Plant Breeding Station, Roslin, Midlothian. Plants, irrespective of their origin, were classified into five reaction groups according to the amount of damage sustained in a specified time by infection with race 1,2,3,4. Consistent results were obtained when test conditions were uniform. In 1956 samples of 53 resistant potato seedlings were tested for blight resistance under natural conditions at the test centre in the Toluca Valley, Mexico, which probably provides the most severe blight conditions in the world, as no variety or species there was reported to be free from the disease. But though the seedlings all became infected, they differed in the amount of damage sustained to a degree corresponding in general to that noted in the laboratory test. As two mutually compatible groups of races are present in Mexico [loc. cit.] and oospores occur in abundance in nature it is probable that the fungus there displays its maximum variability, and that any varieties showing resistance will remain unaffected in the chief potato-growing regions of Europe.

Virus-tested stocks of 29 commercial varieties and 33 advanced potato seedlings in various stages of multiplication were grown at Cauldhall. Initial serological tests revealed a few cases of virus S [35, p. 919], but with their removal no others were detected during the season. The results of a small field trial indicated a range of susceptibility to virus S among six commercial potato varieties. The amount of natural infection present ranged from 10 affected out of 10 plants in Arran Pilot to 3 out of 10 in Craigs Defiance.

In another trial in 1956 the differences between growing plants of the S-infected and healthy series in Craigs Alliance, Majestic, and Kerr's Pink were less marked than in 1955, but S-infected plants matured rather earlier than healthy in all three varieties. All three varieties tended to produce slightly smaller tubers when infected, but only in Craigs Alliance was yield significantly affected. In this variety the yields of S-infected plants were 92·4 per cent. in total and 88·5 per cent. in ware of those of the corresponding healthy controls.

A field trial in 1955 showed that by comparison with Arran Banner, Craigs Royal, and Gladstone, McIntyre, B 24/58, F 53, and D 151 were highly susceptible to virus Y; 2168 d (1), bred for hypersensitive response to this virus, was resistant. McIntyre and F 53 were also highly susceptible to potato leaf roll virus [cf. 36, p. 345]. In studies on virus Y two viruses designated Y2 and NS, were discovered with characteristics linking them, apparently, with the Y and A groups, respectively. Each causes symptoms typical of virus Y on tobacco and other hosts and they have thermal death points between 52° and 58° C. The strain Y2 flocculates anti-Y serum and activates the Ny gene in *Solanum demissum* and *S. simplicifolium* and the Na gene in the first-named species. It has not yet been aphid-transmitted, but induces local lesions on potatoes. Strain NS is transmissible by both sap- and aphid-inoculation; it activates the Na gene in *S. demissum*, but fails to react with anti-Y serum and did not infect potato varieties tested. A third virus, isolated from Catriona potatoes, possesses all the characteristics of strain C of virus Y [25, p. 42] except that it is readily transmitted by aphids.

Evidence obtained indicated that the strains of potato virus X which activate the Nb gene form a circumscribed and relatively uniform serological group characterized by the presence of a specific antigenic fraction and the absence of several antigens found in other groups.

An unusual mosaic disease noted on a potato seedling was found to be due to a strain of cucumber mosaic virus.

BLACK (W.). **Incidence of physiological races of Phytophthora infestans in various countries.**—*Rep. Scot. Pl. Breed. Sta., 1957*, pp. 43–49, 1957.

A table presenting the different physiologic races of *Phytophthora infestans* [see preceding abstract] identified at the Scottish Plant Breeding Station since 1947 and their countries of origin, as well as the races reported in the literature, shows that 15 of the 16 races identifiable by the existing host series have been found, including that with the widest host range, 1,2,3,4 [cf. 34, p. 808]; race 2,3 [loc. cit.] is the only one not so far recorded. The most widely distributed races during the past five years were, in descending order, 4, 0, 1,4, and 1.

Evidence has accumulated which shows that race 4 is now predominant in commercial varieties bred from *Solanum tuberosum*, but no direct evidence is available to determine how long it has existed or when it first became most prevalent. In Scotland it was first recorded in 1947, its discovery coinciding with the identification of genotype R_4. In Holland race 0 predominated in 1951, fell to second place in 1952, and was not found in 1953 and 1954 [34, p. 610]. In Canada the prevalence of race 0 declined relatively rapidly about 1953 [cf. 35, p. 217]. A similar decline occurred about the same time in Southern Rhodesia, where, however, two isolates taken from tomatoes in 1956 proved to be race 0. The evidence points to the gradual and simultaneous decline in race 0 in many potato-growing countries during the past five years, and its replacement by race 4 as the common biotype in commercial crops. The reason for the change is not clear, but it cannot be attributed to the selective influence of genotype R_4, no popular commercial variety being so constituted. New light has, however, been cast upon the whole problem of variation in *Phytophthora* by the recent discovery of compatibility groups of races in Mexico [36, p. 549]. Investigations also suggest that blight races prevalent in the British Isles, Western Europe, Africa, and North America all belong to the same group and are, therefore, incompatible.

That the degree of resistance to *P. infestans* originally displayed by the Voran variety in the Netherlands has not been maintained was attributed by Toxopeus [cf. 36, p. 346] to adaptation by the fungus, but such adaptation appears to be relatively slow and incomplete, as compared with the sudden collapse of hypersensitivity when appropriate races of the fungus arise. Field resistance would appear, therefore, to be more persistent than hypersensitivity, and should on that account provide a more reliable protection against crop failure.

Some of the genetic factors controlling field resistance are, probably, affected by parasitic specialization, others not. Early maturing seedlings having a relatively high field resistance have been obtained by hybridization with *S. simplicifolium*, *S. phureja*, *S. demissum*, and *S. tuberosum*. The best protection attainable would be a combination of the highest possible hypersensitivity with the highest possible field resistance.

GERHOLD (N. R.). **Artificial field inoculation of Potatoes with Alternaria solani.**—*Plant Dis. Reptr*, 41, 3, pp. 135–136, 1 fig., 1957.

At Colorado Agricultural Experiment Station, Fort Collins, Bliss Triumph potatoes were successfully inoculated in the field with *Alternaria solani* by introducing the inoculum into the overhead sprinkling system. Two plots so treated and not sprayed showed 88 and 91 per cent. disease at harvest time.

Houghland (G. V. C.) & Cash (Lillian C.). **Carry-over effects of PCNB applied to the soil for control of Potato scab.**—*Amer. Potato J.*, 34, 4, pp. 85–88, 1 graph, 1957.

Further experiments at Beltsville, Maryland, in 1955 and 1956 confirmed the effectiveness of PCNB as a soil fungicide for control of potato scab (*Streptomyces* [*Actinomyces*] *scabies*) [34, p. 395; cf. 36, p. 347]. Effects were greatest in the first season after applications, infection increasing by three to five times during the following season when no further applications were made. Not more than 150 lb. per acre should be applied in the row; in 1955 the 175 and 200 lb. treatments delayed sprout emergence and retarded plant growth. Total yield was in general less affected by treatments in 1956 than in 1955, though the 175 lb. treatment produced a reduction of 40 bush. per acre in both years.

Palm (E. T.) & Young (R. A.). **The compatibility of certain organic fungicides and antibiotics in treatment mixtures as indicated by stability and phytoxicity.**—*Plant Dis. Reptr*, 41, 3, pp. 151–155, 1957.

Pre-planting treatments of potato seed pieces against decay by *Fusarium* and *Pythium* spp. and the spread of ring rot (*Corynebacterium sepedonicum*) [cf. 36, p. 348 and next abstract] were studied at the Oregon Agricultural Experiment Station, Corvallis. The fungicidal activities of dichlone and captan and the bactericidal activities of streptomycin sulphate and nitrate, and terramycin, assayed against *F. roseum* and *Bacillus subtilis*, were not significantly reduced after aqueous mixtures of the fungicides and antibiotics had aged for one week, but the fungicidal and bactericidal activities of maneb were. Maneb was more bactericidal than streptomycin, but less so than terramycin, with which it was not compatible. None of the mixtures was phytotoxic to seed pieces. In view of its greater bactericidal activity, it is suggested that terramycin should be further tested for control of bacterial ring rot.

Starr (G. H.) & Fina (L. R.). **Effect of temperature on bacterial inoculum from ring-rot-infected tubers as shown by staining tests and by inoculation studies.**—*Amer. Potato J.*, 34, 4, pp. 94–96, 1957.

At the University of Wyoming, Laramie, a suspension of potato ring-rot bacteria [*Corynebacterium sepedonicum*: 35, p. 39] kept at 38° F. could be used for inoculating tubers after 48 hours or more without much loss of viability, whereas at 83° it deteriorated rapidly after 10 hours and induced no ring rot symptoms.

Hingorani (M. K.), Mehta (P. P.), & Singh (N. J.). **Bacterial brown rot of Potatoes in India.**—*Indian Phytopath.*, 9, 1, pp. 67–71, 1956.

Studies at the Indian Agricultural Research Institute, New Delhi, confirmed that ring disease of potato in India is caused by *Pseudomonas solanacearum* [35, p. 279]. None of the isolates from almost all the potato-growing areas in India yielded *Corynebacterium sepedonicum*. *P.s.* var. *asiatica* [cf. 36, p. 230], which differs from *P. solanacearum* in its ability to produce acid in cream and litmus milk, is also widespread, isolates from Punjab, Bombay, and Uttar Pradesh generally yielding *P. solanacearum*, while those from Madras, Mysore, Bengal, Bihar, and Assam gave *P.s.* var. *asiatica*. Infection develops rapidly with increase in soil temperature from 70° to 100° F. and increase in soil moisture from 50 to 100 per cent. water holding capacity, but severity is reduced with the age of the plant.

Nováková (Jarmila). **A new method of isolation of blackleg-pathogens from diseased plants.**—*Phytopath. Z.*, 29, 1, pp. 72–74, 1957.

An adaptation of Stapp's method of serum preparation [8, p. 396] is described, which was used in a serological drop technique for the differentiation of the

potato black-leg pathogen, *Erwinia atroseptica*, from saprophytic bacilli, e.g., *Escherichia coli*, *Bacillus mycoides*, and *B. subtilis*, at the Potato Variety Testing Station, Havlíčkův Brod, Czechoslovakia. A drop of serum with a titre of 1 in 2,560, diluted 1 in 20, is mixed with the above-mentioned organisms from potato dextrose agar cultures on a microscope slide. Agglutination of *E. atroseptica*, visible to the naked eye, developed instantaneously, whereas none could be detected in the other bacilli, even under the microscope. Of 112 isolates, the eight which reacted positively by the serological method were the only ones capable of rotting potato slices.

Adair (C. R.) & Ingram (J. W.). **Plans for the study of hoja blanca, a new Rice disease.**—*Rice J.*, 60, 4, p. 12, 1957.

Plans are outlined for the study of the new rice disease, hoja blanca [36, p. 552], to be initiated in the spring, 1957, in Cuba and Venezuela. Details of the symptoms and incidence of the disease have already been noticed [loc. cit.].

Atkins (J. G.), Cralley (E. M.), & Chilton (J. P.). **Uniform Rice seed treatment tests in Arkansas, Louisiana and Texas, 1955–56.**—*Plant Dis. Reptr*, 41, 2, pp. 105–108, 1957.

In seed treatment tests against rice seedling blight (caused by a number of seed- and soil-borne fungi) during 1955–6 at Crowley (Louisiana), Stuttgart (Arkansas), and Beaumont (Texas), considerable variation was observed in the performance of the various fungicides [27, p. 381]. Significant stand increases of Zenith and Bluebonnet 50 were given by agrox ($\frac{1}{2}$ oz. per bush.), ceresan M ($\frac{1}{2}$) and M–2 X ($\frac{1}{4}$), panogen 15 ($\frac{1}{2}$), MEMA ($\frac{1}{4}$ and $\frac{1}{6}$), arasan SFX (1), delsan AD ($1\frac{1}{8}$), and phygon-XL (1). Mercury fungicides were superior to non-mercurials in controlling *Helminthosporium oryzae* [*Ophiobolus miyabeanus*: 16, p. 771].

[This information is also published in *Rice J.*, 60, 4, pp. 22–24, 26–27, 47, 1957.]

Padmanabhan (S. Y.). **Preserving viability of Rice seeds with fungicides.**—*Indian Phytopath.*, 9, 1, pp. 44–47 (+4 unnumbered), 1956.

In fungicide trials during 1948–9 at the Central Rice Research Institute, [Cuttack], India, for preservative treatment of stored rice cuprocide at 1 in 500 (by weight) gave the best results. No preparation tested was wholly successful in arresting deterioration in certain superfine varieties during the monsoon period, but the more effective treatments preserved viability in the other varieties until September or October.

Padmanabhan (S. Y.), Ganguly (D.), & Chandwani (G. G.). **Control of the blast disease of Rice with spray fungicides.**—*Indian Phytopath.*, 9, 1, pp. 15–22, 1956.

At the Central Rice Research Institute, Cuttack, India, effective control of rice blast (*Piricularia oryzae*) [36, p. 209] on the highly susceptible variety Co. 13, was obtained by four applications, two before and two after flowering, of Bordeaux mixture 5–5–50 or 2·5–3·5–50, coppesan 0·5 per cent., perenox 0·3 per cent., or dithane 0·2 per cent. Bordeaux 5–5–50 was also effective when applied twice after flowering. Low-volume spraying at 20 gals. per acre was as effective as ordinary spraying at 100 gals. per acre.

Evatt (N. S.) & Atkins (J. G.). **Chemical control of straighthead in Rice.**—*Plant Dis. Reptr*, 41, 2, pp. 103–104, 1957.

Near Eagle Lake, Texas, in 1956, feralum (a chemical by-product consisting of 29·86 per cent. ferric sulphate, 2·74 ferrous sulphate, 33·32 aluminium sulphate, 1·58 titanium sulphate, 10·76 free sulphuric acid, 10·16 insolubles, and 11·58 water), applied to the soil at 1,000 and 2,000 lb. per acre before flooding for the

control of rice straighthead [35, p. 790] on Century Patna 231, increased the yield by 80 and 122 per cent., respectively.

The use of feralum is not considered economically practicable at present; further tests should be made with its constituents applied separately.

HASHIOKA (Y.). **Prevalence and fungicidal control of the Rice sheath rot.**—*Agric. & Hort., Tokyo*, 31, 7, pp. 953–957, 1956. [Japanese. Abs. in *Biol. Abstr.*, 31, 6, p. 1807, 1957.]

Rice sheath rot (*Corticium sasakii*) [cf. 35, p. 924] has recently become more severe in Japan, owing to the earlier development of lesions induced by earlier sowing and transplanting; an excessive use of fertilizer has also been a factor. Methoxethylmercury chloride and ethylmercury phosphate are moderately effective in preventing infection. Thiram, if used at 50 per cent., is effective as a dust, as are 2 per cent. dusts containing certain acetoamides. Tetramethyl dithiocarbamic acid methyl arsine (a component of Bayer's 'tuzet' [cf. 35, p. 469]) gives very effective control.

WAKIMOTO (T.). **Overwintering of the Rice leaf blight bacteria in the soil.**—*Agric. & Hort., Tokyo*, 31, 10, pp. 1413–1415, 1956. [Japanese. Abs. in *Biol. Abstr.*, 31, 6, p. 1802, 1957.]

In Kyushu, Japan, *Xanthomonas oryzae* [cf. 35, p. 714; 36, p. 123] can overwinter not only in grain or straw under shelter, but also in the soil round the weed *Leersia oryzoides* var. *japonica*. The fungus was shown to overwinter in the basal parts of rice plants and in weed grasses.

HEINISCH (K. R.) & KÜHR (P.). **The growth of fungi on Rubber.**—*Arch. Rubbercult. Ned.-Ind.*, 34, 1, pp. 1–19, 2 figs., 5 graphs, 1957. [Dutch and Indonesian summaries.]

An expanded account of studies at the General Experiment Station of AVROS, Medan, Sumatra, on mould growth on sheet rubber which have already been noticed [35, p. 926].

BOLLE-JONES (E. W.). **Visual symptoms of mineral deficiencies of Hevea brasiliensis.**—*J. Rubb. Res. Inst. Malaya*, 14, *Commun.* 300, pp. 493–579+5 pp. [unnumbered], 36 pl. (20 col.), 1956.

Descriptions, supplemented by half-tone and coloured plates, based on tests carried out on young rubber seedlings of clone Tjir[andji] 1 or clone PB 86 grown in pot sand culture at the Rubber Research Institute, Malaya, are given of the symptoms of the following deficiencies in *Hevea* rubber: nitrogen, sulphur, phosphorus, magnesium, potassium, calcium, iron, manganese, boron, copper, zinc, and molybdenum [cf. 35, pp. 392, 547]. Data regarding the effect of the deficiencies on plant growth and chemical composition are tabulated.

ABERDEEN (J. E. C.). **Factors influencing the distribution of fungi on plant roots. Part I. Different host species and fungal interactions.**—*Pap. Dep. Bot. Univ. Qd*, 3, 14, pp. 113–124, 2 graphs, 1956.

In further studies on soil fungi at the Department of Botany, Queensland University [35, p. 716] a method was devised for the quantitative estimation of fungi on plant roots by the application of frequencies, i.e., the percentage of times a species is present in a standard sample. Interactions between plant hosts and their root fungi were shown to be statistically significant even with fungi which are regarded as ubiquitous. Interactions were also demonstrated between the individual fungus species on a root.

Henderson (Moira E. K.). **Metabolism of methoxylated aromatic compounds by soil fungi.**—*J. gen. Microbiol.*, 16, 3, pp. 686–695, 1957.

In this further contribution from the Macaulay Institute for Soil Research, Craigiebuckler, Aberdeen, on the metabolism of soil fungi [cf. 35, p. 917], species of *Haplographium*, *Hormodendrum*, and *Penicillium* utilized both *p*-monomethoxybenzoic acids and *p*-monohydroxybenzoic acids before the *m* or *o* forms. *Penicillium* sp. formed *p*-methoxyphenol from *p*-methoxybenzoic acid. Further metabolism of *p*-hydroxybenzoic acid, formed from *p*-methoxybenzoic acid, to protocatechuic acid by *Hormodendrum* and *Penicillium* also took place. In addition vanillic acid was formed from veratric acid by these two fungi. It is suggested that the ability of these soil fungi to demethylate compounds in which the methoxyl group is attached to the benzene ring may have considerable bearing on the transformation of lignified plant materials in the soil.

Guyot (A. L.) & Malençon (G.). **Urédinées du Maroc. I.** [Uredinales of Morocco. I.]—*Trav. Inst. sci. chérifien*, Sér. bot., 11, v+184 pp., 4 pl., 29 figs., 1957.

This first part of the Uredinales of Morocco lists material collected from 1952 to 1956 during journeys throughout almost the whole of Morocco. The fungi are arranged alphabetically under genera and species, and the notes, which are largely details of the attack on the hosts and the dimensions of the fungi, are based on the authors' personal observations. Provisional indexes to hosts and fungi are provided. The section on *Puccinia graminis* (pp. 55–96) gives notes on the over-summering of this species and a list of 26 hosts (six newly recorded, four new for Morocco); the biological details are reserved for a later publication. Six new species are described, including *Gymnosporangium atlanticum*, forming only teleutosori on the branches of *Juniperus phoenicea*. A few of the spores, with a thin wall and a thin transverse septum, average 47 to 27 μ, but most have a wall 2·5 to 4 μ thick and a transverse septum 3 to 5 μ thick; these average 49 to 50 by 24 to 25 μ. Pores range from two to six (usually four) in each loculum; at the apex there is a yellowish papilla 3 to 5 μ wide by 1·5 μ high.

Chona (B. L.) & Munjal (R. L.). **Notes on miscellaneous Indian fungi—III.**—*Indian Phytopath.*, 9, 1, pp. 53–66, 3 pl., 1956.

In this further contribution [cf. 36, p. 213] an additional 20 species of Indian fungi are described, nine of which are new.

The perithecia of *Mycosphaerella phaseoli* n.sp. on *Phaseolus aureus* are 105 to 126 (mostly 112 to 122) μ in diameter with an ostiole 28 to 35 μ, the asci measuring 40 to 52 by 6 to 7 μ and the ascospores 8 to 14 by 3 to 4 (mostly 10 to 11 by 3·5) μ. The conidial state agrees with *Cercospora kikuchii* on soy-bean [35, p. 861], and although no organic connexion was established between this and the ascigerous state, the presence of both in the same spots and the fact that some perithecia bore conidiophores resembling those of *C. kikuchii* suggest that they are states of the same fungus. *Ustilago bromivora* destroyed 70 to 80 per cent. of *Bromus catharticus* plants from a Uruguayan collection at New Delhi in 1950 and has since re-appeared every year. As *B. catharticus* is commonly grown in India, there is a danger that the pathogen may establish itself there. The conidia of *Gloeosporium eugeniae* n.sp., from living leaves of *Eugenia operculata* at New Delhi, measure 8 to 16 by 2·5 to 3·5 (mostly 12 to 15 by 3 to 3·5) μ. *Ceuthospora litchii* n.sp. has spores 7 to 9 by 3 to 3·5 μ; the pycnidia developing in a stroma as round or irregular locules, 180 to 230 by 77 to 90 μ, open by a common pore. This fungus is associated with a severe leaf curl disease of *Litchi chinensis*, affected spots being mostly convex on the upper and concave on the under surface. A velvety superficial outgrowth of elongate cells occurs on the under surface. The disorder is commonly attributed to mite attack, but further study of the role of *C. litchii* is recommended. *Septoria*

dolichi, causing shot holes and ultimate drying up of the leaves of *Dolichos lablab*, has spores 28 to 40 (mostly 32 to 35) by 2·5 μ.

THIRUMALACHAR (M. J.), BHATT (V. V.), DHANDE (G. W.), & PATEL (M. K.). **Additions to the fungi of Bombay—III.**—*Indian Phytopath.*, 9, 1, pp. 9–14, 1956.

Further new records of fungi for the State of Bombay [cf. 32, p. 340] include *Septoria lycopersici* on tomato [map 108].

SNYDER (W. C.), HANSEN (H. N.), & OSWALD (J. W.). **Cultivars of the fungus, Fusarium.**—*J. Madras Univ.*, 27, 1, pp. 185–192, 3 pl., 1957.

The authors briefly state their reasons for employing cultivars in their system of nomenclature in the genus *Fusarium* [25, p. 366; 28, p. 447]. They propose that the cultivars Culmorum, Graminearum, Avenaceum, Acuminatum, Equiseti, and Sambucinum (based on morphological differences) be recognized in *F. roseum*; Dimerum and Gigas in *F. episphaeria*; and Subglutinans in *F. moniliforme* [*Gibberella fujikuroi*]. The adoption of a similar device to simplify the taxonomy of the actinomycetes is urged.

BAUMEISTER (GABRIELLE). **Über Nebenfruchtformen bei Tryblidiella hysterina (Duf.) Shear.** [On the imperfect states of *Tryblidiella hysterina* (Duf.) Shear.]—*Phytopath. Z.*, 28, 4, pp. 445–450, 3 figs., 1957.

Tryblidiella hysterina, collected on box at Fontan, Alpes Maritimes, France, in June, 1955, and isolated three months later, was subcultured on malt agar in the following January. It produced two kinds of imperfect state, one macroconidial of the *Diplodia* type [cf. 18, p. 552] and the other microconidial with one-celled, hyaline spores in unilocular, spherical fruit bodies, 270 to 340 μ in diameter. Neither of the forms could be definitely identified with any existing species, although the second bore a strong resemblance to *Mycosphaerella* (*Phyllosticta*) *limbalis* [29, p. 122] and a relationship with *Phoma delitiscens* might also be considered.

LUTTRELL (E. S.). **Leptosphaeria (Metasphaeria) perfect stages for Helminthosporium turcicum and H. rostratum.**—Abs. in *Phytopathology*, 47, 5, p. 313, 1957.

After 4 weeks at 20 to 25° C. crosses between isolates of *Helminthosporium turcicum* on barley straw sterilized with propylene oxide and embedded in Sachs agar produced black, globular, short-beaked ascocarps 378 μ in diameter containing cylindrical, bitunicate, 2- to 6-spored asci, 176 to 249 by 24 to 31 μ with fusoid, hyaline ascospores, 2- to 6- (typically 3-) septate, constricted at the septa, 42 to 78 by 13 to 17 μ. Single spore isolates gave rise to *H. turcicum*. Similar ascocarps with asci 123 to 162 by 25 to 35 μ and ascospores 39 to 57 by 10 to 14 μ were produced very sparsely by *H. rostratum* on barley grains. Both are assigned to *Metasphaeria* (or *Leptosphaeria* if the former be considered synonymous with it).

ELLIS (M. B.). **Some species of Deightoniella.**—*Mycol. Pap. Commonw. Mycol. Inst.* 66, 12 pp., 6 figs., 1957.

Descriptions and a key are given for the five species of the genus *Deightoniella*, two of which are new. *Helminthosporium torulosum* [map 175], a common pathogen of *Musa* spp., is renamed *D. torulosa*.

ELLIS (M. B.). **Some species of Corynespora.**—*Mycol. Pap. Commonw. Mycol. Inst.*, 65, 15 pp., 8 figs., 1957.

Among the eight species of *Corynespora* dealt with in this paper are *C. citricola*

on living leaves of lime, sometimes causing losses among seedlings in the Botanic Gardens, Sydney, New South Wales, and *C. cassiicola* on leaves and stems of a number of economic and other hosts, including pineapple, chilli, tomato, papaw [36, p. 308], melon, oil palm, soy-bean, *Hevea* rubber, lettuce, bean [*Phaseolus vulgaris*], and cowpea.

Subramanian (C. V.) & Ramakrishnan (K.). **Neottiospora Desm. and two new genera, Samukuta and Sakireeta.**—*J. Indian bot. Soc.*, 36, 1, pp. 68–86, 17 figs., 1957.

In this taxonomic study of the genus *Neottiospora* an emended diagnosis is given; six species are recognized, and of five excluded, two are described in new genera. Material of the pathogenic *N. theae* and *N. oryzae* was not examined.

Benjamin (R. K.). **A new genus of the Gymnoascaceae, with a review of the other genera.**—*Aliso*, 3, 3, pp. 301–328, 1956. [Abs. in *Biol. Abstr.*, 31, 6, p. 1768, 1957.]

A monotypic genus of the Gymnoascaceae, based on *Shanorella spirotricha*, is described. At maturity, the peridial hyphae disarticulate into irregular, thick-walled cells, many of which bear conspicuous coiled appendages. The Gymnoascaceae is reviewed, with a key to the genera.

Corbaz (R.). **Recherches sur le genre Didymella Sacc.** [Studies on the genus *Didymella* Sacc.]—*Phytopath. Z.*, 28, 4, pp. 375–414, 10 figs., 1957. [German summary.]

General observations on the nomenclature and scope of the genus *Didymella* are followed by a brief discussion on its systematic position as a member of the Pseudosphaeriales near *Mycosphaerella* [29, p. 122], the imperfect states of the different species, and the phytopathological importance of *D. pinodes* (of which *M. pinodes* is regarded as a synonym) on peas, *D. applanata* on raspberry, and *D. lycopersici* on tomato. The first part of the paper concludes with a list of 11 species to be excluded from the genus.

Part 2 comprises descriptions of 21 species, including five new ones, namely, *D. valerianae* on *Valeriana montana*, *D. inaequalis* on *Aconitum lycoctonum*, *D. macrospora* on *Lathyrus latifolius*, *D. obstruens* occluding the ostiole of the perithecia of *Leptosphaeria punctoidea* on *Lathyrus silvester*, and *D. nigra* on *Astragalus glycyphyllus*, and three new combinations, *D. astragalina* (syn. *Sphaeria bryoniae* Fuckel var. *astragalina* Rehm and *D. bryoniae* Rehm var. *astragalina* (Rehm) Winter) on *Vicia* sp., *Keissleriella cladophila* (*Didymosphaeria cladophila* Niessl and *Didymella cladophila* Sacc.), and *K. caudata* (*D. caudata* Müll. [32, p. 245]).

Despite the marked similarity between *Didymella* and *Mycosphaerella* the independence of the two genera is upheld. They are separable only on the basis of their imperfect states, those of the former genus belonging exclusively to *Ascochyta* or *Phoma*, while *Mycosphaerella* is characterized by a greater variety of forms, comprising hyphomycetes, microconidia, and pycnidia of the *Septoria* type.

Prasad (N.). **Non-parasitic stem galls on Tobacco.**—*Indian Phytopath.*, 9, 1, pp. 78–79, 2 figs., 1956.

A large number of galls, probably of non-parasitic origin, were observed [in India] on the stem of a greenhouse tobacco plant in a pot infested with *Fusarium oxysporum* var. *nicotianae*.

Lautz (W.). **Resistance to black shank of 51 species of Nicotiana and of 13 interspecific hybrids.**—*Plant Dis. Reptr*, 41, 2, pp. 95–98, 1957.

In tests carried out over a period of five years by the United States Department of Agriculture on the resistance to black shank (*Phytophthora parasitica* var.

nicotianae) [35, p. 641] of 51 *Nicotiana* species and 13 interspecific crosses, none of the plants grown in inoculated soil in pots proved immune. *N. longiflora* and *N. plumbaginifolia* were highly resistant, and *N. undulata*, *N. nudicaulis*, *N. exigua*, *N. paniculata*, *N. repanda*, *N. rustica* [var.] *brasilia*, and *N. rustica* [var.] *pumila* showed moderate resistance. *N. tabacum*×*N. benavidesii* was less susceptible than *N. benavidesii*, and *N. tabacum*×*N. longiflora* had a much higher survival than *N. tabacum*×*N. plumbaginifolia* [28, p. 493], though the resistance of *N. longiflora* was slightly above that of *N. plumbaginifolia*.

Shaw (L.), Lucas (G. B.), & Thorne (G. F.). **Further studies with streptomycin alone and in combination with other chemicals for wildfire control in Burley Tobacco plant beds, North Carolina, 1956.**—*Plant Dis. Reptr*, 41, 2, pp. 99–102, 1957.

In further studies at the Mountain Research Station, Waynesville, North Carolina, in 1956, on the control of tobacco wildfire (*Pseudomonas tabaci*) [*P. tabacum*: 36, p. 282] six-weekly sprays of streptomycin sulphate at 100 or 200 p.p.m. or of streptomycin nitrate at 200 p.p.m. gave good results; either 3 or 5 gals. of the 200 p.p.m. sulphate per 100 sq. yds. was effective. Glycerin at 1 lb. per 100 gals. in combination with streptomycin sulphate improved control only slightly, and tribasic copper sulphate (3 lb.), similarly combined, reduced it.

Lautz (W.). **Treatment of black root rot infested soil with vapam, chlorobromopropene, and allyl bromide.**—*Plant Dis. Reptr*, 41, 3, pp. 174–176, 1 fig., 1957.

In fungicide trials carried out by the United States Department of Agriculture, black root rot (*Thielaviopsis basicola*) of tobacco was effectively controlled by allyl bromide [cf. 33, p. 508] at 3 in 200 gals. water, vapam [cf. 36, p. 335] at 1 in 40, 1 in 100, and 1 in 200, and chlorobromopropene [cf. 35, p. 282] at 3 in 100, and was apparently eliminated by vapam at 1 in 40 and 1 in 100 and by the allyl bromide.

Infected 4 gals. soil samples were treated with 1 gal. solution, plastic covered for 24 hours, exposed for four days, put in 1 gal. jars 12 days later and watered three times, and then planted with 7 in. seedlings 19 days after chemical treatment.

Kanngiesser (W.). **Papierelektrophoretische Untersuchung von druckdialytisch konzentrierten Blattextrakten gesunder und viruskranker Tabakpflanzen.** [Paper-electrophoretic study of pressure dialysis-concentrated leaf extracts of healthy and virus-diseased Tobacco plants.] –*Z. PflKrankh.*, 64, 5, pp. 257–271, 5 figs., 6 graphs, 1957. [English summary.]

In further studies in the current series [cf. 35, p. 346] the use of a pressure dialysis apparatus and of a buffer containing potassium ascorbinate, potassium sulphite, and glycerol largely prevented the denaturation and oxidation of proteins from green tobacco leaves during maceration and concentration of the expressed sap for paper electrophoresis. Analysis by the last-named method, using the above-mentioned buffer, of the chloroplastin-containing solutions resulted in the formation of three protein zones after staining the paper strips with 'amido black 10 B'. A stationary zone at the site of application contained the green pigments, while the velocity of the two mobile zones, which were inseparable, corresponded roughly to that of serum albumin. The isoelectric point of the main protein component of healthy foliage lies between pH 4·8 and 5.

When the concentrate from healthy plants is left standing or homogenized with decaline the stationary proteins flocculate and can be separated by centrifugation. The examination of concentrates from tobacco mosaic virus-infected plants [34, p. 208] showed that the virus protein remains unchanged under these conditions, being traceable as a zone migrating extremely slowly to the anode or remaining stationary after paper electrophoresis. It can be stained either with 'amido black' or a specific

reagent acting only on nucleic acids or other phosphorus-containing, high-molecular substances.

The centrifugation of concentrates of mosaic-diseased tobacco plants or virus X-infected potatoes yielded a soluble sediment containing, besides enriched virus protein, another protein with a mobility range differing from that of the main component of healthy leaves.

Selective staining of the lipid, carbohydrate, and nucleic acid components of the proteids of healthy tobacco leaves produced merely quantitative differences of colour distribution with equal subdivision of the zones. The soluble proteids would thus appear to be complex compounds containing proteins, lipids, carbohydrates, and nucleic acids [cf. 36, p. 134 *et passim*].

Kleczkowski (A.). **A preliminary study of Tobacco mosaic virus by the gel diffusion precipitin tests.**—*J. gen. Microbiol.*, 16, 2, pp. 405–417, 1 fig., 3 diags., 1957.

At Rothamsted Experimental Station proteins separated from purified preparations of tobacco mosaic virus by placing in a protein solution or agar gel were antigenically identical with X-protein [35, p. 127]. More drastic treatment of the virus in borate buffer at pH 8·7 split off more of these proteins, and at pH 10 part of the virus was disintegrated with the release of X-proteins and others antigenically different, designated as Y-protein. Both X-protein and Y-protein consist of mixtures of antigenically different materials.

Bawden (F. C.) & Pirie (N. W.). **A virus-inactivating system from Tobacco leaves.** —*J. gen. Microbiol.*, 16, 3, pp. 696–710, 1957.

At Rothamsted Experimental Station preparations made from freshly expressed sap of the Rothamsted strain of tobacco necrosis virus lost their infectivity slowly at 0° C. and rapidly at 18°. Stable and infective preparations were made by ultracentrifugation after the sap was frozen and allowed to age, while unstable ones were stabilized by prolonged centrifugation at 8,000 *g* or by incubation with citrate and azide.

The exposure of stable virus preparations to leaf sap sediment which had been centrifuged at 4,000 to 8,000 *g*, in the presence of air inactivated them. In the presence of azide this inactivation did not take place. When the sap sediment was kept in air at 0° for several hours a substance of low molecular weight separated out which inactivated the virus whether air or azide were present.

This inactivating property was stronger in sap sediment from tobacco infected with tobacco ring spot viruses than in that from uninfected tobacco or plants infected with tobacco mosaic virus. Tobacco ring spot virus was inactivated by the sediment but not tobacco mosaic virus.

Similar inactivation was caused by aldehydes and by ascorbic acid derivatives. Inactive virus preparations remained serologically active.

These results account for the variations in infectivity in tobacco necrosis virus prepared from sap by different methods.

Bondartsev (A. S.). Трутовые грибы европейской части СССР и Кавказа. [Bracket fungi of the European part of the U.S.S.R. and of the Caucasus.]— 1106 pp., 188 pl. (1 col.), 172 figs., U.S.S.R. Academy of Sciences Publisher, Moscow-Leningrad, 1953. Roubles 55.55.

A detailed study, based on the investigations of natural material and of herbarium specimens, is presented of the Polyporaceae of the European part of the U.S.S.R. and in the Caucasus [see below]. Descriptions are given of 300 species and some 200 varieties and forms, many of which are illustrated. There are a number of new combinations and new forms.

The first part (pp. 9–116) of the book includes general descriptions of the

morphology, anatomy, ecology, geographical distribution, taxonomy, agricultural importance, and control of the Polyporaceae, with methods of studying and preserving specimens. The second part (pp. 117–678) contains diagnoses of all the representatives of the group found in the regions studied and of those which are likely to appear there. Extensive use is made of the world literature (11 pp. of references). The species are listed with annotations concerning their synonymy, substrate, and distribution, particularly inside the Union. Of special interest are the keys for the determination of resupinate, stalked, and irregularly developing forms. There is a colour chart with Russian and Latin names of the colours provided to aid in identification, and indexes of Latin words and expressions frequently used in the text and of Latin names of the fungi are appended. Though the book is intended primarily for specialists it is useful for amateurs.

Sinadsky (Y. V.) & Bondartsev (M. A.). Малоизвестные трутовики на Populus и Tamarix и их значение в Кара-Калпакской АССР. [Little known bracket fungi on *Populus* and *Tamarix* and their importance in the Kara-Kalpak A.S.S.R.]—Бот. Журн. [*J. Bot. U.S.S.R.* = *Bot. Zh. S.S.S.R.*], 41, 8, pp. 1117–1183, 5 figs., 1 graph, 1956.

During a survey carried out in 1954 in the Kara-Kalpak A.S.S.R. *Populus ariana* and *P. pruinosa* were found to be heavily infected by *Inonotus* [*Polyporus*] *pseudohispidus* [see above], which caused premature wilting and reduced the commercial value of the wood. *I.* [*P.*] *tamaricis* attacked the valuable Uzbek species of tamarisk, *Tamarix ramosissima* and *T. pallasii*. A new form, *I.* [*P.*] *tamaricis* f. *corneus* on *T. ramosissima*, differs from the species chiefly by the absence of a granular core at the base of the sporophore and by its horn-like consistency.

Control measures recommended against these fungi include the removal and destruction of the sporophores before the period of spore dispersal (June to August), removal of infected trees, and the avoidance of bark and branch injury and animal grazing, particularly in young plantings.

Dzhafarov (S. A.). Грибы семейства Polyporaceae на древесно-кустарниковых породах в Ленкоранской зоне Азербайджанской ССР. [Fungi of the family *Polyporaceae* on tree-shrub species in the Lenkoran' zone of the Azerbaijan S.S.R.]—Изв. Акад. Наук Азерб. ССР. [*Bull. Acad. Sci. Azerb. S.S.R.*] 5, pp. 85–94, 1956. [Abs. in *Referat. Zh. Biol.* 6, pp. 109–110, 1957.]

Forty species of parasitic and saprophytic fungi belonging to 15 genera of the Polyporaceae are described on trees in the Lenkoran' zone of the Azerbaijan S.S.R. Some of the species are new records for the U.S.S.R. and for the Caucasus.

Smitskaya (Mme M. F.). Грибні хвороби деревних та чагарникових порід Букових лісів Закарпатської області. [Fungal diseases of tree and shrub species of Beech forests of the Trans-Carpathian region.]—Укр. Бот. Журн. [*J. Bot. Acad. Sci. Ukr.*], 12, 4, pp. 87–92, 1955. [Russian summary.]

In 1953–4 a survey was carried out of the fungi on trees and shrubs in beech forests in the Trans-Carpathian U.S.S.R. Of the 75 species (the majority saprophytic) recorded on beech, *Fomes fomentarius* [cf. 16, p. 425] was the most widespread and dangerous and was also found on birch, willow, and hornbeam. *Fomitopsis* [*Fomes*] *pinicola* and *Ganoderma applanatum* were prevalent and serious on beech and other species. *Pleurotus ostreatus* var. *pulmonarius* was frequently encountered on beech. *Trichosporium fuscum* on beech constituted a new record for Ukraine.

Among the fungi on hornbeam were *Diaporthe carpinicola* [*Melanconis hyperopta*], *Cryptospora* [*Cryptosporella*] *aurea*, and *Cenangium carpini*, all rare.

On oak, *Daedalea quercina* was most frequently encountered; also of importance were *Clithris* [*Colpoma*] *quercina*, causing necrosis and wilting, and *Vuilleminia* [*Corticium*] *comedens* [loc. cit.], frequently present on the branches.

The most important species on maple [*Acer* sp.] were *Rhytisma acerinum* and *Uncinula aceris*.

Elm was frequently affected by *Polyporus squamosus*, which also attacked beech and field maple [*Acer* sp.]. *Cylindrosporium ulmi* was very widespread.

The 20 or more species recorded on birch included *Melampsoridium betulae* [*M. betulinum*], the most prevalent, *Phyllactinia suffulta* f. *betulae*, *Polyporus betulinus*, *F. fomentarius*, *F. pinicola*, and *G. applanatum*. *Melampsora tremulae* was frequent on aspen and *Phellinus* [*Fomes*] *tremulae* was its most dangerous parasite.

Among the fungi on fir [? spruce] were *F. pinicola*, *P.* [*F.*] *pini*, and *P.* [*F.*] *hartigii*.

The greatest number of fungi were recorded on hazel (*Corylus avellana*), *Phyllactinia suffulta* f. *coryli avellanea* [*P. corylea*] being very widespread.

WINTERFELD (K.). **Holzzerstörungen durch Pilzbefall an Grünästungswunden der Rotbuche.** [Wood destruction by fungal attack on pruning wounds in the Copper Beech.]—*Holzzentralbl.*, 82, 87, pp. 1089–1090, 2 figs., 3 graphs, 1956.

Following an investigation in Hanover, Germany, of the extent of fungal penetration in heading-in wounds [i.e. those caused by removal of side branches] in copper beech, the author reports that in the course of drying out the stubs provide a very favourable medium for the growth of [unspecified] fungi, but that the processes of gummosis and tylosis formation in the 'protective zone' restrict penetration by preventing water loss from the tissue behind and reducing the ingress of air. Subsequently the growth of bark over the wound, by completely excluding air, brings fungal growth to a halt.

Fungi were isolated from the brown-stained zone behind the 'protective zone' in the stubs of naturally occurring breaks, but not from those of heading-in cuts, and the stain extended further in the former. In heading-in stubs dating from 1928, which had successfully barked-over, white rot and browning had not advanced since a similar study was undertaken on the same trees by the author in 1938.

In stubs 21 to 30 mm. in diameter on trunks which were growing well penetration progressed rapidly and regularly until the barking-over had gone on for six years but continued thereafter at a much reduced tempo. In trunks which were growing poorly, however, penetration was more rapid and continued without a check after the sixth year. Normally wounds of this size are sealed on dominant trunks in five years and on subdominant trunks in six. Culturing of chips from the rotting zone of the stub indicated that no mycelium survived three years after completion of barking-over, whereas cultures from unsealed stubs were 90 per cent. positive (triplicate samples). Chips from various parts of the stubs and surrounding areas indicated that within the stub mycelial fungi diminished with increasing distance from the cut or break, though they were often demonstrable in the brown streaks above and below the stubs, incidence decreasing with distance from the stub. They were not present in the pith of the stubs though bacteria and yeasts were numerous. By comparison the pith at the centre of the main branches yielded mycelial fungi, bacteria, and yeasts, as did also red heartwood. In discoloured surface wounds on the branches there was 26 per cent. fungal infection, corresponding with that in the interior of the stubs, together with somewhat heavier yeast and bacterial infection.

The time of heading-in and the type of disinfectant paint used appeared to have no effect, except that barking-over began earlier over spring wounds.

RACK (K.). **Versuche zur Bekämpfung des Eichenmehltaus.** [Experiments on the control of Oak mildew.]—*Forst. u Holz*, 12, 1, pp. 5–6, 1957.

In comparative fungicide trials at the Forest Experiment Station, Lower Saxony, against oak mildew [*Microsphaera alphitoides*: cf. 34, p. 495] plots of four to five-year-old trees were given three treatments, the first being applied when slight infection was noted. The level of attack was estimated on the basis of the proportion of the youngest (uppermost ten) leaves affected on a number of shoots, assessments being carried out on 4th and 21st September, 1956.

One per cent. Bordeaux mixture gave excellent protection (0 to 0·2 per cent. infection), with no toxic effects, seeming slightly but not significantly superior to red and green copper at 0·3 per cent. (0 to 0·5 and 0·7 to 1 per cent., respectively, compared with 100 on the unsprayed). There was slight burning with the red and green copper. Wettable sulphurs A and B at 0·4 per cent. gave good and statistically equal results (1·3 to 4·7 and 3·2 to 6·5 infection, respectively). Dithane was entirely ineffective, the infection rate being higher (111 per cent.) than in the controls.

Owing to accidental overdosing with the spray and conflicting results from dust treatments it was concluded that the data did not permit an assessment of karathane. The spray (0 to 4·7 per cent. infection), however, seemed comparable with the sulphur preparations, and caused no burning.

PESANTE (A.). **Osservazioni su una carie del Platana.** [Observations on a decay of Plane.]—*Ann. Sper. agr.*, N.S., 11, 2, *Suppl.*, pp. ccxlix–cclxvi, 10 figs., 1957. [English summary.]

A plane tree (*Platanus* sp.) removed on account of a trunk rot from a street in Turin showed an intensely red coloration in the wood of the collar and roots, almost exclusively limited to the medullary rays, where there was a somewhat regular alternation of more and less discoloured segments. In a transverse section of a decayed branch the affected inner part of the wood was separated from the unaffected outer part by a dark brown layer a few mm. thick, with a black, internal margin.

From fragments of decayed wood the author constantly isolated a fungus which reproduced the symptoms (fully described) on small pieces of healthy *Platanus*, and is regarded as the causal organism. It is named *Haplaria ochracea* n.sp. From the blackened wood bordering an infected zone a second fungus was isolated, which when grown on healthy *Platanus* wood limited itself to the superficial layer.

On carrot agar *H. ochracea* formed a compact, white, zonate colony, later becoming cottony and dirty white, with chocolate-coloured areas. The hyphae measured 1 to 3 μ in diameter. Ochraceous tufts developed, consisting of repeatedly forked, erect hyphae 2 to 3 μ in diameter and 200 to 400 μ long, producing single obovate or ellipsoidal conidia (radula spores), measuring 2 to 3·5 by 4 to 6 μ, ochraceous in the mass, but almost colourless individually. The conidial wall was smooth and thin, with an insertion scar sometimes visible. On sterilized, artificially infected *Platanus* wood stromata developed which probably represented the immature perithecial state of a *Hypoxylon*.

The secondary fungus formed at first only an immersed dark mycelium on carrot agar, but later, a sparse, greyish, aerial mycelium developed. A transverse section of the culture showed a dense, black surface layer, with some hyphae 1 to 10 μ in diameter and others with catenulate torulose elements (chlamydoconidia) measuring 5 to 10 by 6 to 15 μ. Microsclerotia of various sizes formed. In the aerial mycelium conidia were formed by the septation and disarticulation of the hyphae. They were 5 to 10 μ long and 1 to 3·5 μ in diameter when unicellular, multiseptate segments being of varied lengths.

This fungus, which has certain analogies with *Geotrichum* and *Polyscytalum* but possesses brown chlamydoconidia, is considered to belong to a new genus and is named *Scytalidium lignicolum*.

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